Farming in Hampshire:

National Pilot - Test and trialling a local governance of Environmental Land Management

ELM Convenor Advisory Board, Sponsored by Defra

Document 4 of 7

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Natural Capital Baseline and Opportunities

by eftec and Environment Systems

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About this project

As part of the Environment Land Management (ELM) Scheme Hampshire Advisory Board Test & Trial (T&T), we have been commissioned to **provide a baseline natural capital assessment for the six largest National *Character Areas*** (NCAs) in Hampshire.

This means understanding the benefits nature provides for Hampshire's economy and people, and the ecologically, economically and financially feasible ways of managing nature, within the regulatory requirements and the reality of businesses that depend on nature.

We also want to empower land users and managers with this information so they can make better choices about their finance options.

In the process, we are learning about how to communicate this information and provide lessons for Defra too.

This document

- **Section 1** is a **non-technical summary** which provides a high-level summary of this work, covering:
  - The key messages from this work
  - The state of natural capital and the key benefits at an aggregate NCA level
  - The main opportunities for improvement and scale of potential funding (both public & private)
  - It concludes with lessons learned for the attention of the Board and Defra
- **Section 2** presents the natural capital baseline and scale of opportunity for each of the 6 NCAs, covering:
  - Baseline assessment of natural capital
  - Assessment of benefits and environmental costs
  - Main risks to natural assets
  - Scale of the potential for improvement
  - Suggested priorities
  - Note ***weblinks to detailed maps are provided*** to allow you to explore the baseline assets and opportunities

Note: for detail of methodologies and results see document 7, "Natural Capital Technical Report".

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Section 1: Non-technical Summary

Key questions our work answers:

- What are the key natural assets that support life and the economy in each of the NCAs? **Baseline Natural Capital Assets**
- Given the existing land uses and management practices, what benefits do these assets provide and how valuable are they? **Benefits assessment**
    - **Private benefits** like food provision, water supply and quality, timber
    - **Public benefits** like biodiversity, air quality, access to nature for recreation and physical health – which do not generate cash flows in conventional markets but may attract private investment and public funding
    - **The disbenefits** of agriculture such as emissions of greenhouse gases, diffuse pollution (**environmental costs**)
- What are the **risks** to the sustainable management of these natural assets and their benefits?
- What are the **priority opportunities for improvement** that could be made to land management in each NCA? Priority determined by ecological feasibility, economic benefits and financing opportunities.
- What potential **private and public sector finance** is available to fund these improvements?
- How to quantify the gap between the value of nature's benefits and the payments available to fund them.

Key Messages

Baseline State of Natural Capital

Natural Capital of Hampshire underpins many benefits (over £660 million/year that can be quantified, and much more that can't, such as biodiversity for its existence and resilience value). However, our work also shows there are many threats and environmental costs to current patterns of land use/management practice. Chiefly:

- **Greenhouse gas (GHG) footprint of farming is a significant contributor to climate change** (environmental cost in range £70-240 million per year, using Department for Energy Security and Net Zero central non-traded carbon values). As farming is the major land use activity in the county, we only assessed emissions from farming, but clearly other sectors (transport, industry etc.) are major sources too. Typically, 11% of GHG emissions in UK are from farming.
- **Depletion of soils is a major risk**, through loss of soil carbon, declining microbial health and soil erosion/run-off. Soil is a vital asset that takes many years to build, and rates of depletion can be very high.
- **Water pollution from farming and wastewater treatment**. Issues include pesticides and soil run-off, but the most acute problem is nutrient loading (especially nitrates from fertiliser use). Issues for drinking water (additional costs to water cos – difficult to estimate but at the very least in region of £ 5-13 million per year in operational costs alone). Costs to the wider water environment are even more significant but much harder to quantify. Pollution in Solent is major obstacle to further building development in Hampshire.
- **Climate change is a major threat to water resources** in one of the most water stressed regions of England. Greatest threats are to water supply, farming and the wider natural environment. Building natural resilience will be vital to mitigating this risk.
- In common with much of the UK, **Hampshire has lost much of its biodiversity over the last 50 years**. Unique features in Hampshire include, species rich grassland, chalk streams, heath and woodland in the New Forest, and the loss of many features that support wildlife.
- **Population growth and development pressures will add the the problems above**, adding to water resource demand, water pollution problems, loss of land for nature and pressures on the natural environment for recreation and well-being.

What Can Be Done to Improve the Condition & Value of Nature?

Two approaches are key;

- **Eliminate or minimise the negative environmental impacts of existing land use**/economic practice.
- **Maintain and enhance natural capital to increase the value of benefits** delivered. Key principle is to understand the potential benefits that can be generated for a particular piece of land and make decisions that are:
    a. Ecologically feasible - what changes will work for the natural assets concerned?
    b. Economically beneficial - what benefits can be delivered at what cost?
    c. Aligned to policy objectives for Hampshire and by each NCA,
    d. Acceptable to stakeholders, and,
    e. Fundable (by public or private sources) - will someone pay for this?

It is possible to achieve major improvements in restoring biodiversity, sequestering more carbon, reducing GHG emissions (so addressing climate impacts), improving water quality, and enhancing recreation, and wellbeing, whilst sustaining food and timber provision and improving resilience to future climate change pressures. It is not a simple case of foregoing one benefit for another.

To reverse threats/losses and to increase the value of benefits provided by natural assets, our suggested opportunities for Hampshire have been prioritised by considering;

i) the scale of benefits currently provided, or future potential to be provided, by natural assets,

ii) the level of environmental harm that impacts the county's natural assets, and

iii) the risks to these assets.

Suggested Priorities to Improve the Condition & Value of Nature

Based on our assessment of condition, benefits, risks and opportunities we suggest:

1) **Given the extent of agricultural land use, there is a pivotal role for agriculture**, to reverse biodiversity loss, mitigate climate change, improve food security, and sustain local community resilience and well-being. The value of these multiple benefits can far exceed the value of food produced and should be recognised as important contributions made by farming to wider society. However, the challenges are huge, and solutions will require less use of harmful inputs, elimination of pollutants to air, soil and water, use of nature sensitive farming methods, investing in soil health and conservation (see item 4 below), use of regenerative agriculture methods and maximising the multiple benefits of land (depending on its location).
2) **Build soil health** and carbon sequestration as a core priority for sustaining biodiversity, building resilience for food production and mitigating climate change. This should be a priority on all soils (not just on farmed land).
3) **Water supply & quality as a key priority for the county**. Water resources will become even more valuable with increasing climate pressures and a growing population. Again, a broad range of actions will be needed, from more efficient consumption, to better water resource management, and above all to the elimination of water pollution.
4) **Nature recovery through both nature sensitive farming and targeted habitat creation/restoration** at high value and protected sites. The forthcoming Hampshire Local Nature Recovery Strategy (LNRS) will set local priorities but will require concerted effort across the county if recovery is to be effective.
5) **Provision of greater access for recreation and well-being** can generate very significant benefits but taking care to avoid nature sensitive sites. Greatest benefit is generated by creating circuits and networks of public access routes, and close to areas of large population with scarce/low current levels of provision.

Many of these priorities reinforce each other, (e.g. Investment in soil health can sequester more carbon, enhance food production, build resilience and help regulate water flow/use.). Furthermore, some land use changes can address deliver multiple benefits. For example, spatially targeted multi-functional woodland can; sequester carbon (in soil as well as in above ground vegetation), regulate water flow and quality, provide valuable habitat, and potentially support enhanced recreational value.

Agriculture as Key to Improving Natural Capital

For Hampshire, ***agriculture is, and will be key to preserving and improving the ecological, economic, and social wellbeing*** in the county, and in supporting national and international goals. Other habitats and land uses are important too but given the scale of agriculture, and its scope for impact on nature, it is the most important land use for delivering improvements to natural capital.

Widespread uptake of nature sensitive, and regenerative farming methods is key to achieving both local and national environmental goals, as well as providing greater resilience to farmers to meet growing future pressures such as climate change.

Intensive agriculture farming methods can have significant environmental costs including diffuse water pollution (especially nitrates but also pesticides), impacts on biodiversity (though loss and degradation of habitat, and pesticide and herbicide use), and air quality (ammonia and nitrous oxide emissions). Various schemes may be deployed to help farmers move away from harmful use of inputs and practices.

How agriculture is performed, such as land sharing with nature, combined with nature sensitive farming methods and avoiding harmful practices, is key with respect to its role in:

- Maintaining/enhancing local food production and contributing to national food security
- Contributing to the natural landscape characteristics of each NCA and to the economic and social fabric of local communities
- Reversing losses to biodiversity
- Improving soil quality, as a means of increasing resilience to climate change, enhancing productivity and carbon sequestration, and underpinning biodiversity through greater soil health
- Mitigating/reversing climate impacts through greater carbon sequestration and avoiding greenhouse gas emissions
- Improving water quality, through reductions in diffuse pollution, soil erosion, and adoption of nature-based solutions where spatially justified
- Improving water flow through provision of flood mitigation measures: riparian woodland, restoration/maintenance of floodplains and improved soil structure (improved rainwater infiltration and absorption, so less run-off)
- Maintaining and improving access to the natural environment (where appropriate), for recreation, health and wellbeing, and supporting the tourist economy in priority locations (national parks and others)
- Supporting urban resilience for example through natural flood mitigation measures, and woodland that improves air quality by removing pollutants.

The relative importance of these different benefits varies crucially with spatial location, which is why mapping opportunities and location specific data is so important.

Soil is key to supporting all the benefits from all land (not just farmland). Improving soil structure, carbon stock, and microbial health, not only underpins food production, water flow and water quality benefits, but can provide resilience to future pressures such as climate change. Hence building soil carbon, improving structure, and avoiding erosion and compaction are vital measures for sustaining the health of all soils.

Water supply & quality as a key priority

Land management practices and patterns of land use in the county have a significant impact on both the quantity and quality of water in the natural environment, hence are a major issue of environmental concern.

- **Cost and risks to public water supply**. Groundwater, and to a lesser extent surface waters, are key to public water supply (PWS) but are prone to pollution from agriculture and wastewater treatment works. Several pollutants are an issue in the county, but the most significant problem for PWS is nitrate pollution, adding to treatment costs and operational challenges of blend water sources to meet drinking water standards. Consequently, there is significant effort and investment being undertaken by water companies (and the government via ELM schemes) in ***nutrient reduction measures,*** to reduce nutrient pollution at source, or provide natural solutions that regulate water quality.

- **Risks to the wider water environment**. Pollution to the general water environment is also a problem, with several surface water bodies not achieving good ecological status and ***significant issues of nutrient loading in the Solent*** arsing from widespread and upstream pollution sources across the county. This is a major constraint on new building development in Hampshire, and the ***introduction of nutrient neutrality measures*** is designed to tackle the issue whilst providing a potential funding stream to reduce and mitigate water pollution.

- **Water resources at risk**. Water abstraction (for both public water supply and agricultural use) puts significant pressure on water resources in one of the most water stressed parts of the country. Worsening impacts of climate change will only increase this pressure and will require innovative solutions to water resources management.

Nature recovery

Both the wider countryside, and protected areas, have important roles to play in reversing declines in biodiversity and delivering nature recovery. Hence nature-based improvements in farming and broader land uses should be coordinated with with the management and restoration of protected sites. For nature to recover, targeted, co-ordinated and collaborative action will be required:

- Given the scale of farmland and broader land use, provision of features that will support wildlife will be key to nature recovery
- Protected sites will be unlikely to recover if adjacent farmland is poorly managed and a source of environmental harm.

Biodiversity is important and the opportunities outlined in this report should be aligned with the emerging Local Nature Recovery Strategy (LNRS), which is expected later this year. The LNRS must include a baseline map of habitats, and a written statement of local biodiversity priorities. In advance of the LNRS we have provided an indication of the scale and type of habitat creation/restoration that is ecologically beneficial in each NCA:

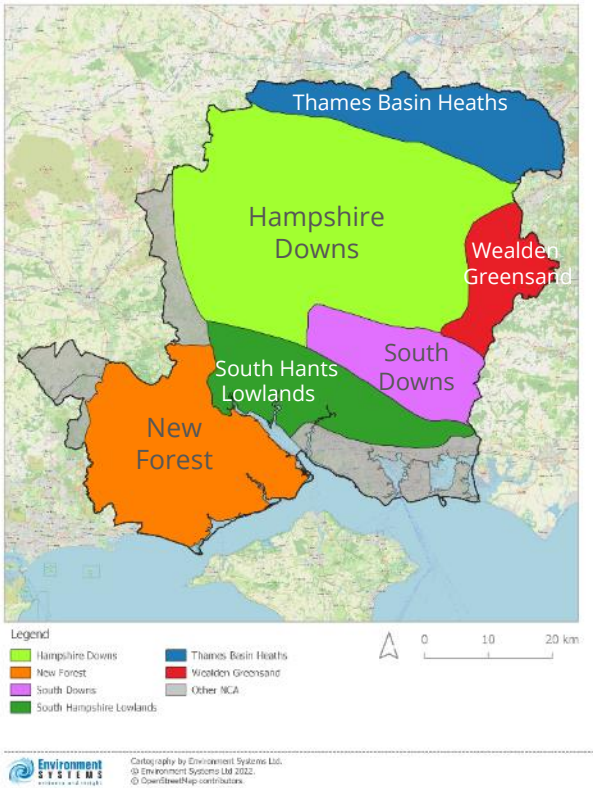
- Our analysis has considered those habitat features that (i) improve ecological connectivity; (ii) improve existing designated sites (SSSIs), and (iii) would be beneficial but are outside the ecological network and outside any designated site. This project has taken a strategic approach to focus on reducing key countywide environmental risks and issues, considering where using nature-based solutions will optimise appropriate environmental outcomes.

- Ecological opportunities have been assessed for woodland, grassland, wetland, heath and various farmland features (hedgerows, field margins and riparian tree planting).

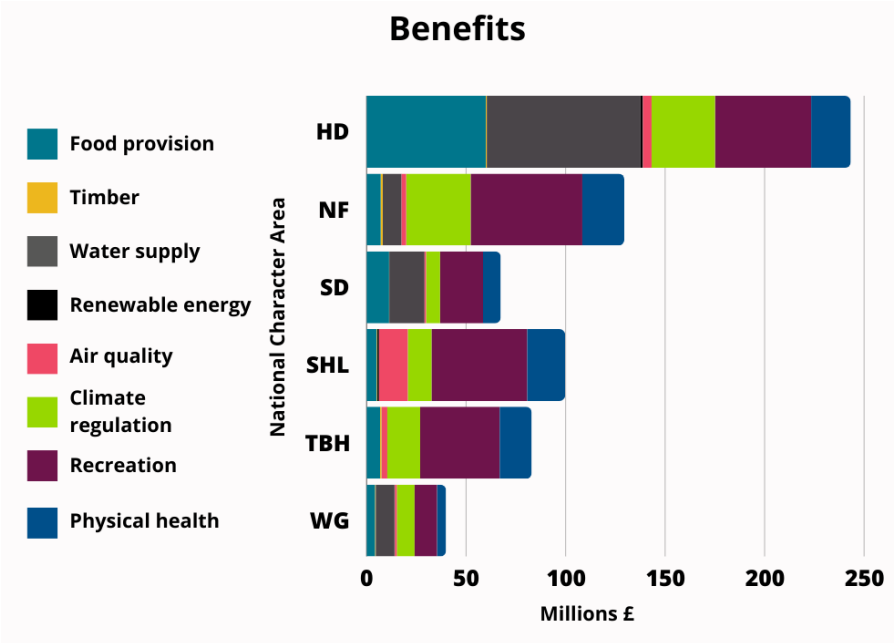
- Whilst these target areas are small, they provide a high level of ecological value, and at relatively low cost in terms of foregone output.

Baseline Benefits from Land Use

Our work looks at the six Natural Character Areas that cover 90% of Hampshire…



…and values a range of public and private benefits from nature (over £660 million/year)

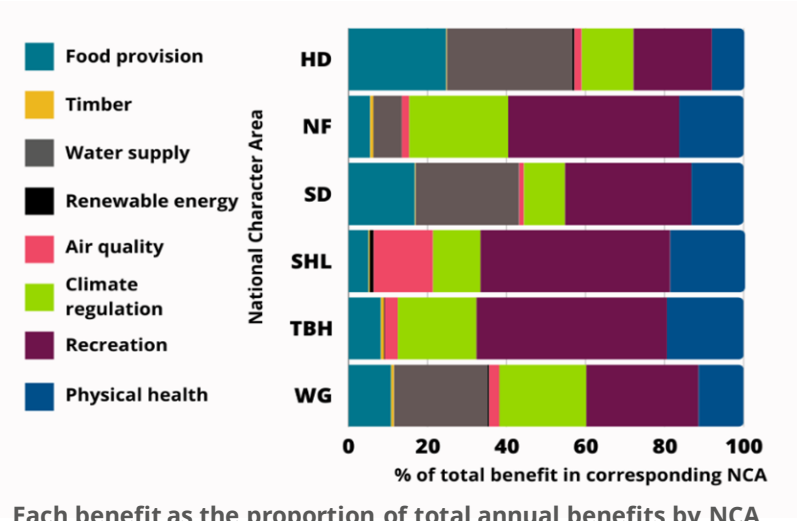


£ values are current annual values (2024 prices). The technical report provides detail on how benefits have been evaluated.
HD: Hampshire Down, NF: New Forest, SD: South Downs, SHL: South Hants Lowlands, TBG: Thames Basin Heaths, WG: Wealden Greensand

Baseline Benefits from Land Use

The profile of benefits and opportunity varies across each NCA . For example, the highest recreational value and well-being benefit is for public access sites close to large population centres (e.g., South Hampshire Lowlands and Thames Basin Heaths).

Total public benefits can be greater than the total private benefits, illustrating the multiple benefits of natural assets, and the importance of considering all benefits and beneficiaries in land use decisions.



Each benefit as the proportion of total annual benefits by NCA
HD: Hampshire Down, NF: New Forest, SD: South Downs, SHL: South Hants Lowlands, TBG: Thames Basin Heaths, WG: Wealden Greensand

But it has not been possible to quantify and express all benefits in monetary terms. **Significant benefits not evaluated in monetary terms**:

- Water quality regulation,
- Flood risk mitigation, and
- Diversity of nature

Baseline Disbenefits from Land Use

Environmental costs we could quantify include:

- **GHG emissions from farming vary widely but are significant (a**nd can be greater than the value of food production):
  - Arable emissions vary significantly by crop and by farm enterprise. Main emissions are; nitrous oxide emissions from decomposition of fertiliser and crop residues, the GHG associated with the manufacture of fertiliser (and other inputs), carbon dioxide emissions released from soil disturbance through tillage, and farm fuel use (e.g., diesel).
  - The most significant sources of livestock emissions are, enteric fermentation (methane) emissions from ruminant grazers (mainly cattle and sheep), nitrous oxide emissions from decomposition of fertilisers and, GHG emissions associated with the manufacture of inputs (fertilisers feed etc.).
  - There is significant variation in the emissions intensity of agricultural production (see range of low, medium and high in table below), but this demonstrates that there is scope for the average and below average producers to improve the the better GHG footprint levels of performance.
- **Diffuse water pollution to public drinking water supply** (especially nitrates but also pesticides). The range of costs (£5-13 million/year) here is a rough estimate of the annual costs of nitrate removal only. Broader water disbenefits are likely to be much greater than this.

Indicative range of disbenefits (Total all 6 NCAs, £'m/year)

Disbenefit	Low	Medium	High
Arable GHG emissions	(39.5)	(61.1)	(135.0)
Livestock GHG emissions	(27.7)	(54.8)	(106.7)
Nitrate removal costs	(5.0)	(10.1)	(12.8)
Total	**(72.2)**	**(126.1)**	**(254.5)**

Environmental costs we could not quantify include:

- **Soil erosion.** Risks for this have been mapped but quantifying estimates of soil last are difficult to forecast.
- **Losses to biodiversity. -** though loss and degradation of habitat, diffuse pollution and pesticide and herbicide use,)
- Broader impacts of diffuse water pollution to the natural environment

Opportunities to Improve the Condition & Value of Nature

The table below provides **some indicative scale and value** on the benefits of improvement opportunities that are possible within Hampshire. Not all improvements can be readily expressed in monetary terms (such as biodiversity benefits of habitat creation), but these are quantified in terms of area created.

Opportunity	Quantification of Physical Benefit	Potential Value Indication £'m/year
Farm GHG emissions reduction	90 $ktCO_2e$/year	£4-25 million/year
Soil carbon sequestration	20-40 $MtCO_2e$ (over say 50 years)	£110-220 million/yr (for say 50 years)
Priority woodland creation (3,400 ha)	2.4 $MtCO_2e$ (over 70 yrs)	£2-9 million/yr for 70 yrs
Other woodland creation (3,900 ha)	2.7 $MtCO_2e$ (over 70 yrs)	£2-10 million/yr for 70 yrs
Priority grassland creation	3,000 ha	Note 1
Priority heathland creation	2,000 ha	Note 1
Priority wetland creation	6,500 ha	Note 1
Biodiversity Net Gain (offsetting development impacts)	196 BUs (over 10 yrs)	£0.4-1.2 million/yr For ten years
Hedgerow creation	77 $ktCO_2e$ Over 30 years	£0.1-0.7 million/yr for 30 years
Water quality improvement - nutrient reduction measures	8,000 tonnes Nitrate removed	£5-13 million /year
Total		**c. £120-280 million/year**

Note 1: The creation of habitat in priority areas provides very significant benefits for biodiversity. Quantifying this benefit in monetary terms is very difficult and not adequately captured in monetary terms. Consequently, no value is attributed to the benefits of these habitats here.

Notes:

Farm GHG reductions: assume arable and livestock output emissions reduce so that average footprint improves to 50% of difference between mean and the best.

Soil Sequestration: in arable and improved grassland only, as this represents the greatest opportunity for improvement. Values based on 30-60 tC/ha increase over 50-year period (roughly 1-2% Soil Organic Carbon increase).

Priority woodland, grassland, heathland and wetland creation: Priority habitat creation provides a connecting benefit with an existing ecological network, or within designated sites (such as a SSSI). Benefits of creating these habitats are difficult to adequately evaluate in monetary terms so has not been presented here. The exception is woodland creation which does provide a carbon sequestration benefit and is included in this table.

Other woodland creation: There are opportunities for diverse and multifunctional woodland creation. This can provide many benefits such as water quality, water flow regulation, and enhance recreational value and well-being, depending on design and location. Only carbon sequestration benefit is evaluated here.

Biodiversity Net Gain: Now a legal requirement to offset any biodiversity losses arising from development that cannot be mitigated on-site. The scale of this market is difficult to forecast, but values here are based on previous modelling work performed by eftec.

Hedgerow creation: based on opportunities to improve the hedgerow network. Can provide significant benefits for wildlife, but only carbon sequestration benefit evaluated here.

Water quality improvement: Evaluated as reducing nitrate inputs to avoid drinking water treatment costs. Benefits to the wider water environment are likely to be much greater.

What Funding is Available?

Of the main potential financing options, only a few (mostly public sources) are available at scale – **scale of values for Hampshire are indicative.** For detail description of mechanisms and estimates see Document 7: Natural Capital Technical Report

	Grants	ELM			Ecosystem Service Markets						
Opportunities	Private Grants	SFI	CS+	Landscape Recovery	Carbon	BNG Units	Other BD	Nutrient Neutrality	Nutrient Reduction	Other [c]	Other returns[d]
Re-gen Agriculture		Y	Y	Y					Y	Emerging	Y
Soil Sequestration	Y	Y			Emerging						Y
Supply chain support	Y									Emerging	Y
Woodland creation	Y		Y	Y	Y	Y	Emerging	Y			Y
Grassland creation	Y	Y	Y	Y		Y	Emerging			Emerging	
Heathland creation	Y	Y	Y	Y		Y	Emerging			Emerging	
Wetland creation	Y	Y	Y	Y		Y	Emerging	Y		Emerging	
Biodiversity Net Gain (BNG)						Y					
Hedgerow creation	Y	Y		Y	Emerging	Y					
Nutrient reduction	Y	Y	Y	Y				Y	Y	Emerging	Y
Current Funding (England)/year	Unknown	£2,400 m			£5 m [b]	>£20 m	Unknown	Unknown	Unknown	Unknown	Unknown
Hampshire £'m/year	Unknown	**~£80 m** [a]			**>£1.8 m**	**~£1m**	Unknown	**~£5m**	**>£1.2 m**	Unknown	Unknown

Y= existing funding mechanism in operation, "emerging" = market in development. Funding assumptions and notes as follows:

(a) Hampshire core NCA farm area is around 3.3% of England's utilised agricultural area and ELM funding is indicated as the England average (£273/ha).

(b) UK volume of woodland carbon code deals at average price in 2022, however this market can be expected to grow substantially over the next decade or so.

(c) Other emerging ecosystem markets include natural flood mitigation, and social prescribing.

(d) Other returns includes income and benefits that may be an ancillary benefit of an improvement, such as reduced fertiliser cost from nutrient reduction, or improved crop yields with increases in soil carbon.

Funding and the Value of Nature.

Funding currently falls well short of the total economic value of nature, and whilst markets/funding may grow, **it is unlikely that the price paid for environmental units in nature markets will ever fully capture the true economic value of nature**. It is important to not equate funding with the true value of nature.

Consequences for decision making:

1. Land use decisions and spatial priorities should be based on a complete view of the potential benefits that can be delivered, and not solely on what funding is available at the time of land use / management decision.
2. Use of funding mechanisms should support the overall priorities for land use, rather than optimise a funding steam at the expense of other more valuable benefits (if these must be foregone to achieve the funding stream requirements).

Given the evolving nature of public and private funding, there is a particular barrier in that Defra rules for bundling/stacking are too complicated and landowners are postponing decisions until the overall market is more clear/certain.

Lessons for Defra Test & Trial

- Decisions about public and private funding need information on what is funded and what benefits can be delivered from natural assets, recognising that there can be a significant gap between the two.
- Before making decisions about how to use their land and which benefits to sell, Land owners / managers ought to have access to information on the assets they have, what benefits they provide and who may be interested in paying for those benefits.
- While we are able to quantify and value the many benefits from nature, financing potential is still emerging and/or unclear. There is a big gap between the potential benefits of nature and finance available to deliver them. This project helps addressone key barrier and makes another more explicit, respectively:
    - Reducing uncertainty: Information presented here is intended to help both funders and land owners in gaining the same understanding about what is funded and what returns can be expected.
    - Clarity of objectives and making them reality: LNRSs identified priorities for local areas, which we used in our work.
- The priorities for funding needs to be supported by the involvement of the relevant stakeholders, which is why the composition of this Board and what it can do with this information is important.
- Finally, necessary time and resources should be given to enable different stakeholders to familiarise themselves with the information and language from different approaches. There is a tendency to underestimate the time needed for the information to be internalised. However, without that time, we risk selecting wrong priorities and wasting even more time, money, and more importantly, natural (and social) capital.

Recommendations

From this work we think the following are important recommendations:

- Defra increases ELM resources to fund appropriate soil health measures and encourage greater uptake of regenerative farming methods.
- All counties (or at similar sub-national level) should have publicly available biodiversity/habitat opportunity maps – hosted by local records centres (or similar permanent archive)
- County based (or similar) convenors to publish, periodically review, and update statements of local priorities and monitor change over time.
- To inform priorities and to monitor change overtime, all counties (or at similar sub-national level) should produce and publish periodic natural capital accounts.
- Defra to provide clarity on stacking and bundling of public and private finance, as the current uncertainty is a significantbarrier to uptake of funding options.

Section 2: Detail Assessment by NCA

For each NCA, we explore

- The key **natural capital assets** and the **private and public benefits** they provide – noting that not all benefits can be quantified or measured in monetary terms
- **Disbenefits** – the cost of impacts on the environment such as emissions of greenhouse gases and water pollution – noting again that not all disbenefits could be measured here
- The **risks** to natural assets and outcomes such as biodiversity, water supply and soils
- This is why we have identified **opportunities for improvement** that sustain current economic activity, manage risks and improve natural assets and their benefits
    - Opportunities must be ecologically feasible, economically beneficial, aligned to policy goals and compliant with regulations
    - Opportunities need to be fundable through public funds or private investment or both
- Existing and emerging (public and private) **funding opportunities**
- Putting the whole information together from baseline benefits to opportunities to their implementation in a **strategic business planning framework**
- This whole approach needs to make sense to the Board and be acceptable to all the stakeholders (landowners, managers, public and private funders, policy makers and the general public

The Board can use a ‘strategic business planning framework’ to consider all this information together when setting priorities

Priority opportunities that are ecologically feasible, economically beneficial and has the potential to be funded for the given NCA

1. Drivers for Change • Such as climate change, nitrate pollution, development, population growth	**5. Stakeholders** • Who are material to the NCA, and beyond and whose support is needed to realise the potential opportunities
2. Priorities for the NCA • Priorities when managing land for agriculture, nature recovery, water, and recreation. There are other priorities, but these are the ones assessed here.	**6. Risks** • Risks and uncertainties surrounding the success of the opportunities
3. Timescales • For delivering priority actions and benefits	**7. Key enablers** • Including information, communication, support and delivery mechanisms
4.Costs • Investment and on-going maintenance expenditure is too complex to quantify, but major elements of investment/cost are but • Costs of priority actions as ballpark estimates as specific actions are too difficult to identify and cost at the NCA level	**8. Monitoring** • How will success be measured - what to measure and how frequently?

Some of these are common to all NCAs, while for others there is considerable variation.

Hampshire Downs NCA

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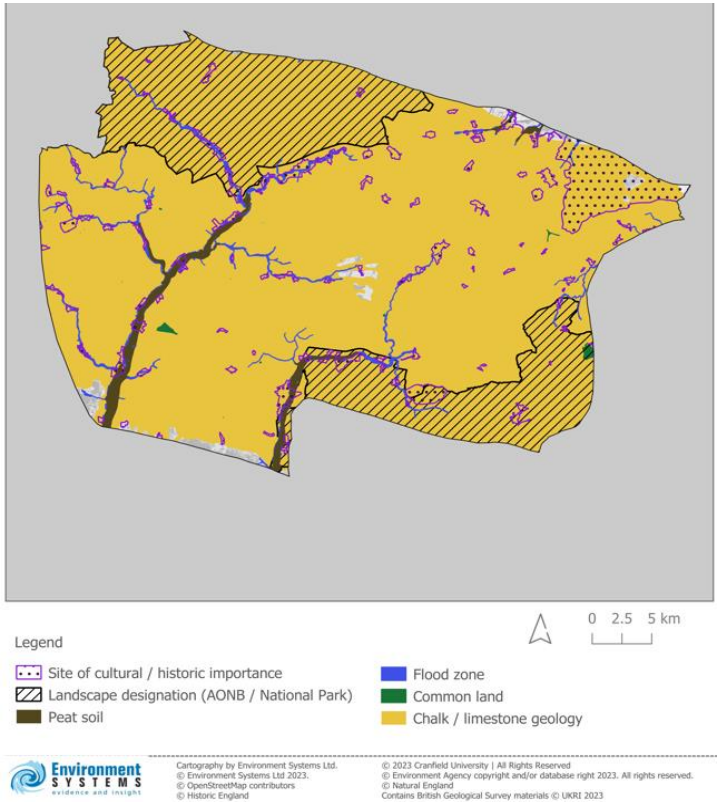
Table of Contents for Hampshire Downs NCA Assessment

Key natural assets in Hampshire Downs

Land Cover	Area (ha)	%
Arable	93,519	66%
Improved grassland	9,514	7%
Semi-natural grassland	1,737	1%
Rough pasture	75	<1%
Woodland & hedgerows	21,157	15%
Wetlands	388	<1%
Water bodies	594	<1%
Coastal margins	3	<1%
Urban/sub-urban	14,311	10%
Other - sea	0	<1%
Total	**141,299**	**100%**

Numbers may not add due to rounding



Link to large scale map

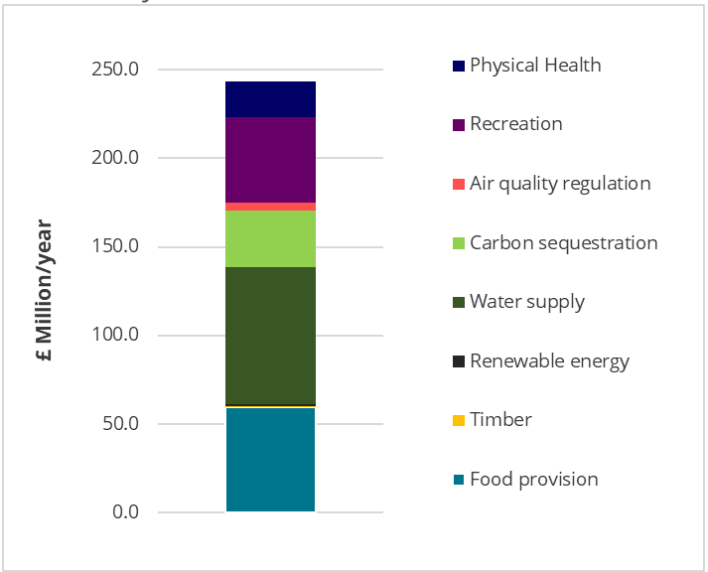
- Over 70% of the NCA is used for agriculture, predominately arable.
- There are 661 agricultural holdings with 1,873 FTE jobs.
- Woodland area at 15% of the NCA is a valuable for wildlife and carbon sequestration.
- Key natural features include ***chalk soils, species rich grassland and the chalk streams of the Test & Itchen*** (largest in England).
- Water abstraction from Test & Itchen aquifers provides a large % of public water supply. Water abstraction is 115 million m^3 per year.
- Substantial proportion of land is designated, 20% overlap with North Wessex Downs National Landscape, 8% with South Downs National Park.
- Given extent of agriculture, natural farmland features (hedgerows and margins) are important for wildlife.

Nature's benefits in Hampshire Downs

These are only a sub-set of benefits that have been possible to quantify and express in monetary terms. Significant benefits not evaluated in monetary terms: water quality regulation, flood risk mitigation, and diversity of nature

Benefit type	£m /year	%
Arable food production	53	22%
Livestock food production	7	3%
Timber production	<1	<1%
Renewable energy (solar)	1	<1%
Water supply	77	32%
Carbon sequestration	32	13%
Air quality regulation	4	2%
Recreation	48	20%
Physical Health	20	8%
Gross Benefits	**243**	**100%**

Numbers may not add due to rounding.



- ***Food production is a major benefit*** (£60 m/year) reflecting the proportion of land used for farming. This benefit is crucially dependent on maintaining and enhancing soil condition as a mitigation against climate change and sustaining food production.
- Public rights of way and greenspace generate ***significant benefits for recreation*** (£48 m/year) and physical health from such recreation (£20 m/year).
- **Public water supply** (£77 m/yr) depends heavily on abstraction from groundwater aquifers. Under pressure from diffuse nitrate pollution and climate change.
- Woodland generates substantial benefits of carbon sequestration (£32m/yr) and removes air pollution with associated health benefits (£4m/yr).

Disbenefits from agriculture in Hampshire Downs

(£m/year)	Low	Med	High
GHG emissions from arable land	(28)	(42)	(93)
GHG emissions from livestock	(11)	(21)	(41)
Diffuse water pollution from agriculture	(3)	(8)	(10)
Total costs	**(42)**	**(72)**	**(145)**

Numbers may not add due to rounding

The main environmental costs that we have quantified are:

- **GHG emissions from agriculture – evaluated separately for arable and livestock production**. The low and high estimates are based on national minimum and maximum footprints per unit of output, reflecting the very wide range in impacts. The medium is based on the mean estimates. These emissions are valued at the UK government central non-traded carbon value (2024).
- **Diffuse water pollution from agriculture**. Nitrate pollution a very significant cost in the Hampshire Downs. The estimate here is based on the expected costs of water treatment to remove nitrate. However, the cost to the the wider natural environment can be far higher.

Costs that we have not been able to quantify include:

- **Soil erosion and loss of soil organic carbon**. Some studies have estimated losses at over £1,000 million for England and Wales. It is not possible to apportion that cost to Hampshire Downs, but losses are likely to be significant, especially for intensive arable farming practices.
- **Loss of habitat and biodiversity**. Hampshire Downs has witnessed a significant decline in biodiversity since the 1950s, arising from human activity across the board from agriculture to residential and commercial development, in particular the loss of species rich grassland and wetland.

Risks to water and soils in Hampshire Downs

Waterbody Status Groundwater condition	Area (ha)	% of NCA
Poor	139,352	99%
Good	1,260	1%

Surface water WFD Status	Km	%
High	-	-
Good	183	75%
Moderate	55	23%
Poor	6	3%
Bad	-	-
Total	**244**	**100%**

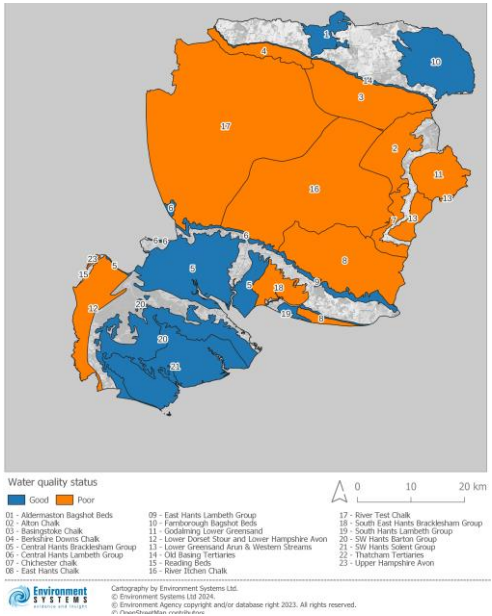
Numbers may not add due to rounding

Other elements at risk –

- **Water quality (especially groundwater) is poor -** severely impacted by diffuse nitrate pollution. Test and Itchen groundwater nitrate levels at around 25-40 mg/l nitrate [1]. Most local water supply is from groundwater aquifers and costs of water treatment are expected to rise, without action to reduce pollution at source. 75% of pollution is attributable to agriculture [2].
- **Soil erosion risks** are high on arable soils (see soil erosion risk map link)
- **Most of the NCA is already drought limited** and abstraction will become a more acute problem with climate change (see drought risk map link)

Note 1: EA (2012) Nitrates: challenges for the water environment
Note 2: 7th November 2023 Water Company Catchment Work Brief to Hampshire Advisory Board

Hampshire Groundwater Chemical Status



Link to large scale map

Soil and drought risk maps:

Soil erosion risk map: Link to large scale map
Soil carbon stock map: Link to large scale map
Drought risk map: Link to large scale map

Risks to biodiversity in Hampshire Downs

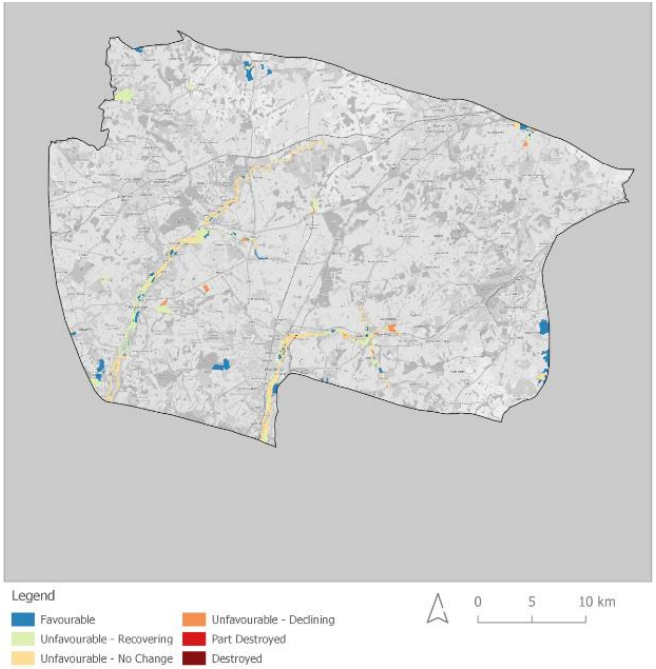
Designated and Priority Land/Habitats

Types overlap so are not additive.

Land	Area (ha)	% of NCA
National Park & Nat. Landscape	39,564	28%
Priority habitats	15,949	11%
Designated sites (SSSI)	2,021	1%
SSSI Status	**Area (ha)**	**% of SSSI**
Favourable	658	33%
Unfavourable Recovering	858	42%
Unfavourable No Change	383	19%
Unfavourable Declining	119	6%
Other	3	<1%
Total	**2,021**	**100%**

Numbers may not add due to rounding

- Only 33% of SSSI area is in favourable condition. Although small the wetlands & water bodies of Test & Itchen are major designated sites (SSSI,SAC), mostly in unfavourable condition (multiple issues for unfavourable condition, but diffuse pollution a major factor).
- As farmland represents the major area of land use, losses of key features such as field margins, hedgerows and riparian woodland can have an adverse impact on biodiversity in the NCA.



SSSI Condition: Link to large scale map

Opportunities for improvement to soil and water in Hampshire Downs

All of the actions mentioned in the introduction can be undertaken in Hampshire Downs, and they have the potential to, jointly or individually, deliver many benefits and outcomes.

Given the current prevailing land use, and ecologically feasible opportunities in the NCA, the following maps assess the opportunities for the Board to consider:

- Soil carbon sequestration opportunities map link
- Soil erosion risk reduction opportunities map link
- Surface water quality improvement: map link
- Groundwater quality improvement: map link

Zoom into the links to see specific locations within Hampshire Downs and the scale of opportunity.

Opportunities for habitat creation in Hampshire Downs

Indicative scale based on ecological suitability mapping

	Prime Areas (ha)	Other Areas (ha)
Grassland	1,114	9,878
Woodland	305	14
Heathland	-	260
Wetland	1,646	1,726
Farmland margins	559	3,148
Total	**3,624**	**15,026**
% of NCA	3%	11%

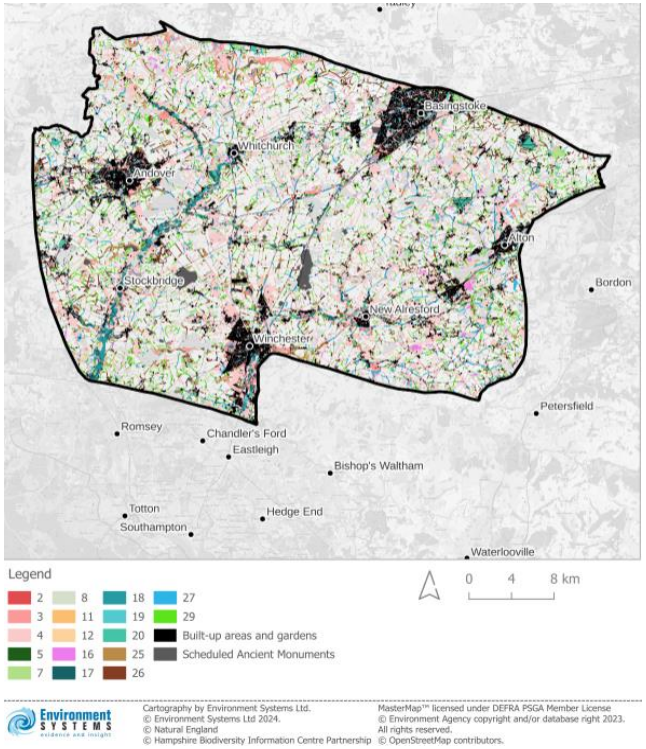
Numbers may not add due to rounding

Opportunities are illustrative of the type and scale of habitat creation that would be most beneficial to promoting nature recovery. Opportunities will be further refined through the work of the forth coming Local Nature Recovery Strategy.

Opportunities to enhance biodiversity have been considered based on ecological suitability and categorised as follows. **Prime Target Areas** covering 3,600 ha (or 3% of the NCA) are defined as:

- Opportunities to increase ecological connectivity and resilience ***and*** within a designated (priority) zone
- Opportunities to improve habitat within a designated (priority) zone, or
- Other opportunities to increase ecological connectivity and resilience but outside a designated area.

Other opportunities (15,000 ha or 11% of the NCA) are areas suitable for habitat improvement but not forming part of the ecological network nor inside a designated (priority) zone.



Link to map

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Priority opportunities, benefits and funding in Hampshire Downs

The scale of potential opportunities and funding at NCA level are shown here. The following slide lists more specific opportunities and where these may be implemented.

Actions	Natural capital benefits that can be achieved	Measuring and valuing those benefits	Funding potential
Soil monitoring & planning Regen-agriculture, SFI soil options	**Soil carbon sequestration:** Increase SOC% on average by up to 2%.	• **Public:** up to 450,000 tCO_2e sequestered/year or up to £120 million per year (2024 values) • **Private:** Likely increase in productivity and improved resilience to drought	• **ELM**: SFI and CS options • **Carbon Markets**: Soil carbon market still emerging (indicative ~£20 million at current voluntary carbon prices)
Regen-agriculture Farm carbon audits and improvement planning	**GHG emissions reduction:** All farms improve emissions and shift NCA average halfway towards best emissions per unit output	• **Public:** Up to 46,000 tCO_2e reduction per year or £6-13 million per year (2024 values) • **Private**: May reduce costs, other actions may add cost or reduce output but should be small (not quantified)	• **ELM:** SFI • **Supply chain assistance**: indicative carbon value ~£2-4 million/year at current voluntary carbon prices
Nutrient planning, Regen-agriculture, SFI water quality options	**Water quality improvement:** Major reduction in nitrate leaching and all water bodies go up to good chemical status	• **Public:** Avoided nitrate removal costs £3-10 million/year (Indicative - TBC with Water Co.s) • **Private:** Wide variety of measures, precision fertiliser use will reduce costs (up to £2 million/year), others could add cost or reduce output but should be small	• **ELM**: SFI and CS options • **Water Co Funding**: more than£1 million • **Self funding:** Savings in fertiliser cost: up to £2 million
ELM CS options Woodland creation	**Biodiversity: Habitat creation and restoration** (see opportunity maps and habitat breakdown): • In priority area (3,620 ha, 3% of NCA) • Other areas (15,000 ha, 11% of NCA)	• **Public:** 24,000 tCO_2e sequestered/year or £3-6 million per year (2024 values); Improved Test & Itchen SAC condition and surface water condition; Enhanced ecological network for spices rich chalk grassland; Improved margins for wildlife on farmland • **Private:** May be some timber and wood fuel income from woodland creation	• **ELM:** CS options & landscape Recovery • **Woodland carbon credits**: ~£1.2 million /yr at current voluntary carbon prices • **BNG credits**: • **Grant Funding**: Public, Private, NGO, philanthropic

Suggested priority opportunities for improvement in Hampshire Downs map to the general priorities set for the NCA

General Priorities by the NCA or the National Park	Specific Opportunities	Where?
A. Restoring and enhancing the microbial health of all soils, and protect the fragile chalk soils from further erosion	Monitor soils & create improvement plans	All Farmland
B. Reduce nitrate levels through environmentally sensitive farming operations	Create nutrient plan	All Farmland
	Lower nitrate applications/ provide water quality features	In catchment sensitive zones
C. Reduce pollution entering rivers and use nature based solutions to improve water quality	Prevent soil erosion and use nature based solutions to improve water quality	In catchment sensitive zones
D. Protecting, connecting, enhancing and expanding key sites for nature, with the focus on priority sites;	Species rich Grassland creation (focus on priority sites)	In priority zones (as per the BD opportunities map), but also other sites if suitable.
	Improve/restore water bodies (esp Chalk streams)	In Itchen & Test SSSIs
	Heathland creation (focus on priority sites)	In priority zones (as per the BD opportunities map), but also other sites if suitable.
	Wetland creation (focus on priority sites)	
	Woodland creation (focus on priority sites)	
	New Hedgerow creation	Where the network is extended
	Nature sensitive farming	All Farmland
E. Maintain access to the countryside for health and wellbeing	Create, maintain and improve public access	Improve network in scarce locations
F. Restoration and management, including grazing, of species-rich, seminatural chalk grassland to achieve favourable condition;	Species rich Grassland creation (focus on priority sites)	In Priority zones
G. Extend semi natural species rich chalk grassland (to achieve LNRS	Species rich Grassland creation (focus on priority sites)	In Priority zones
H. Protect and continue to manage Sites of Importance for Nature Conservation (SINCs)	As above in D	In SINCs

Strategic Business Planning Framework for Hampshire Downs

Priority opportunities that are ecologically feasible, economically beneficial and has the potential to be funded:

- Soil carbon sequestration
- GHG emission reduction
- Water quality improvement (mainly through nutrient reduction)
- Biodiversity habitat creation and restoration (targeted at priority areas)

1. **Drivers for Change**
- Climate change - worsening drought and water stress/pressures, wildfire risks
- Ongoing nitrate pollution to water environment Development pressures on wildlife/habitat and water quality (especially nitrates)
- Population growth - provision of space for recreation and well-being – moderate to low

5. **Stakeholders**
- Convincing farmers/landowners is key to driving nature sensitive farming
- Farm clusters vital for coordinated water quality improvement. These can also help as aggregators for private finance schemes.
- Clear guidance on ecological priorities (what to create and where) in the NCA.

2. **Priorities for the NCA**
- Restore and enhance fragile chalk soils
- Reduce nitrate levels through environmentally sensitive farming operations
- Reduce pollution entering rivers, water meadows, peat soils, mires and fens in the flood plains
- Protect, connect, enhance and expand key sites for nature
- Maintain access to the countryside for health and wellbeing

6. **Risks**
- Soil sequestration is difficult to predict, and gains may be reversed. Understanding the saturation point of soils is key – greater soil monitoring and research is essential.
- Extent to which voluntary carbon markets may expand is uncertain. Soil carbon has significant potential but has challenges.
- Water quality funding to meet public water supply requirements may not be sufficient to improve the general water environment

3. **Timescales**
- Nature sensitive farming uptake will be dependent upon availability of funding, knowledge and advice. Clear benefits case needs to be apparent. [Achievable at scale in medium term 10-20 years]
- Participation in water schemes depends upon attractiveness of incentives. Also groundwater hydrology means it may take decades for nitrate levels to fall after measures implemented.
- Habitat creation depends upon funding, advice & knowledge. Achievable in medium to long term (up to 50 years).

7. **Key enablers**
- Advice & know how and to whom - Clear and agreed local priorities are communicated effectively
- Access to finance - Aggregator vehicles to reduce transaction costs and make projects more fundable.

4. **Costs**
- Significant investment in nature sensitive farming techniques on around 100,000 ha of farmland (c 600 holdings)
- Nutrient reduction measures across farmland in groundwater catchments (most of the NCA)
- 3,000 ha of priority habitat creation (mainly chalk grassland and wetland in Test & Itchen)

8. **Monitoring**
- Uptake of nature sensitive farming methods (% of land managed in this way)
- Water quality measures (nitrate leaching balance to zero, improvement in WFD chemical status)
- Area of new habitat created /restored by type (woodland, wetland, heath, grassland etc)

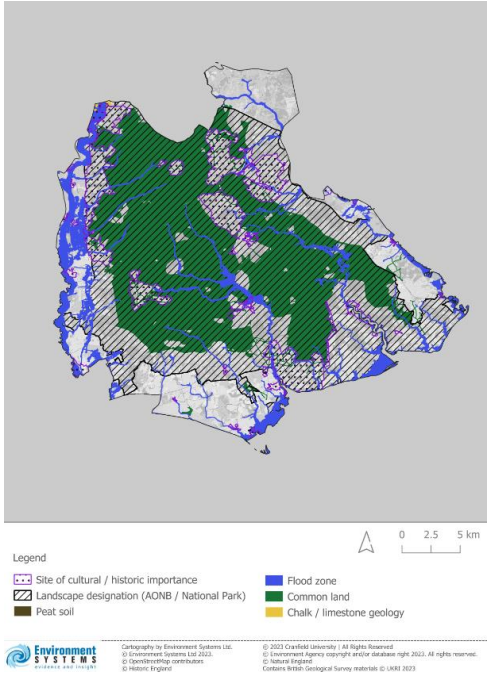
New Forest NCA

Table of Contents for New Forest NCA Assessment

Key natural assets in New Forest

Land Cover	Area (ha)	%
Arable	14,056	21%
Improved grassland	4,822	7%
Semi-natural grassland	4,987	7%
Rough pasture	10,261	15%
Woodland & hedgerows	20,556	31%
Wetlands	2,962	4%
Water bodies	878	1%
Coastal margins	453	1%
Urban/sub-urban	8,062	12%
Other - sea	161	<1%
Total	**67,197**	**100%**

Numbers may not add due to rounding



Link to large scale map

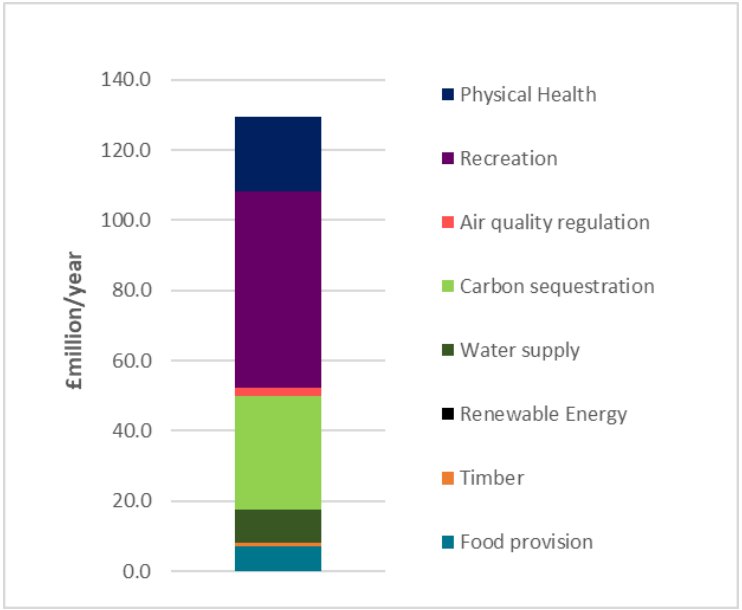
- Unique mix of woodland, heath and other smaller habitats of the New Forest NP. Majority of area is common land and in NP (see map).
- Traditional commoners grazing is key to preserving the New Forest Landscape character. Grazing is the main feature, largely undisturbed by agriculture, because of its designation as a medieval royal hunting forest, survival of grazing as part of a pastoral tradition, ancient Forest Law and more recent conservation policies.
- Most land is ALC 5, however, some is higher quality (closer to coast) and 20% of land supports arable food production.
- Agriculture is on smaller scale (under 20ha most common), but over 400 holdings and supporting around 1,000 FTE.
- Large tracts of unenclosed ancient semi-natural mature oak and beech wood pasture. 60% of the woodland cover is managed by the Forestry Commission.
- Water abstraction from Lower Dorset Stour and Lower Hampshire Avon aquifer (poor chemical status) supports public water supply (est. at 13 million m^3).
- Provides accommodation/catering for £72 million of tourism spend in the National Park.

Nature's benefits in New Forest

These are only a sub-set of benefits that have been possible to quantify and express in monetary terms. Significant benefits not evaluated in monetary terms: water quality regulation, flood risk mitigation, and diversity of nature

Benefit type	£m /year	%
Arable food production	3	2%
Livestock food production	4	3%
Timber production	1	1%
Renewable energy (solar)	<1	<1%
Water supply	9	7%
Carbon sequestration	32	25%
Air quality regulation	2	2%
Recreation	56	43%
Physical Health	21	16%
Gross Benefits	**129**	100%

Numbers may not add due to rounding.



- Recreation, tourism and well-being are by far the largest economic benefits in the NCA, reflecting the importance of the National Park to both local residents and visitors.
- Public rights of way and open access land also generates significant benefits for public recreation (£56m) and physical health (£21m)
- Tourism spend assessed at £72 million within the park (in addition to the above).
- Woodland generates substantial benefits of carbon sequestration (£27m) and air pollution removal (£2m) benefits, which greatly exceed the timber production value of this woodland.
- Commoners grazing is crucial to maintaining the unique character of the New Forest.

Disbenefits from agriculture in New Forest

(£m/year)	Low	Med	High
GHG emissions from arable land	2	3	6
GHG emissions from livestock	6	12	23
Diffuse water pollution from agriculture	<1	<1	<1
Total costs	**8**	**15**	**29**

The main environmental costs that we have quantified are:

- **GHG emissions from agriculture –** evaluated separately for arable and livestock production. The GHG footprint of farming is a modest dis-benefit reflecting the lower level of food production relative the other parts of Hampshire. The low and high estimates are based on national minimum and maximum footprints per unit of output, reflecting the very wide range in impacts. The medium is based on the mean estimates. These emissions are valued at the UK government central non-traded carbon value (2024).
- **Diffuse water pollution from agriculture**. We believe nitrate pollution may be a significant cost in the Avon Aquifer (we did not have a contact in Bournemouth Water to confirm). The estimate here is based on estimated volumes of water abstracted and the expected costs of water treatment to remove nitrate. However, the cost to the the wider natural environment can be far higher.

Costs that we have not been able to quantify include:

- **Soil erosion and loss of soil organic carbon**. May be significant in some areas, but appreciably lower than NCAs where arable farming is more prevalent. Losses are likely for any intensive arable farming practices.
- **Loss of habitat and biodiversity**. Much of the NCA falls within the National Park, and hence a protected landscape, however over 40% of the designated site area is not in favourable condition.

Risks to water and soils in New Forest

Waterbody Status

Groundwater condition	Area (ha)	% of NCA
Poor	10,147	19%
Good	42,098	81%

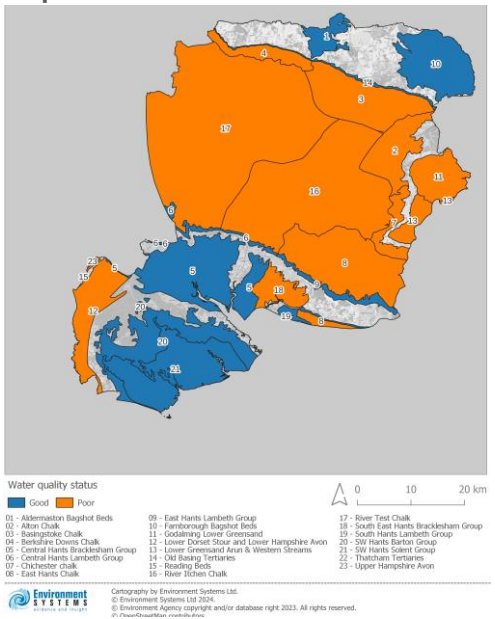
Surface water WFD Status	Km	%
High	-	-
Good	73	20%
Moderate	300	80%
Poor	-	-
Bad	-	-
Total	**374**	**100%**

Numbers may not add due to rounding

Other elements at risk -

- **Water quality –** Wetlands & water bodies: Most surface water bodies (80%) in moderate condition only. Avon aquifer has poor chemical status.
- **Soil erosion risks** are high on arable soils (see soil erosion risk map link) but a small area. Most land is ALC5, and relatively high soil carbon stock, reflecting wooded and largely uncultivated land).
- **Most of the NCA is already drought limited** and abstraction will become a more acute problem with climate change (see drought risk map link)

Hampshire Groundwater Chemical Status



Link to large scale map

Soil and drought risk maps:

Soil erosion risk map: Link to large scale map
Soil carbon stock map: Link to large scale map
Drought risk map: Link to large scale map

Risks to biodiversity in New Forest

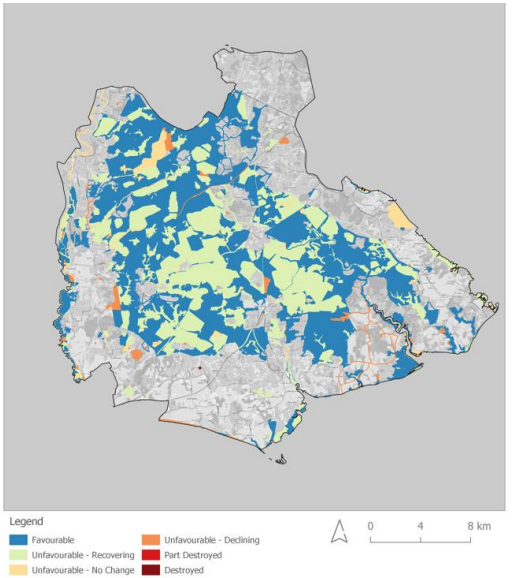
Designated and Priority Land/Habitats

Types overlap so are not additive.

Land	Area (ha)	% of NCA
Priority habitats	31,864	47.4%
Designated sites (SSSI)	32,051	47.7%
SSSI Status	**Area (ha)**	**% of SSSI**
Favourable	18,047	56%
Unfavourable Recovering	12,176	38%
Unfavourable No Change	1,186	4%
Unfavourable Declining	640	2%
Other	2	<1%
Total	**32,051**	**100%**

Numbers may not add due to rounding

Nearly half the NCA is designated, and the majority (56%) in favourable condition, but 44% in need of improvement.



SSSI Condition map link

Opportunities for improvements to water and soil in New Forest

All of the actions mentioned in the introduction, can be undertaken in New Forest, and they have the potential to, jointly or individually, deliver many benefits and outcomes.

Given the current prevailing land use, and ecologically feasible opportunities in the NCA, the following maps assess the opportunities for the Board to consider:

- Soil carbon sequestration opportunities map link
- Soil erosion risk reduction opportunities map link
- Surface water quality improvement: map link
- Groundwater quality improvement: map link

Zoom into the links to see specific locations within New Forest and the scale of opportunity. The benefits from these opportunities are presented in the next slide.

Opportunities for enhancing biodiversity are included on a following slide.

Opportunities for habitat creation in New Forest

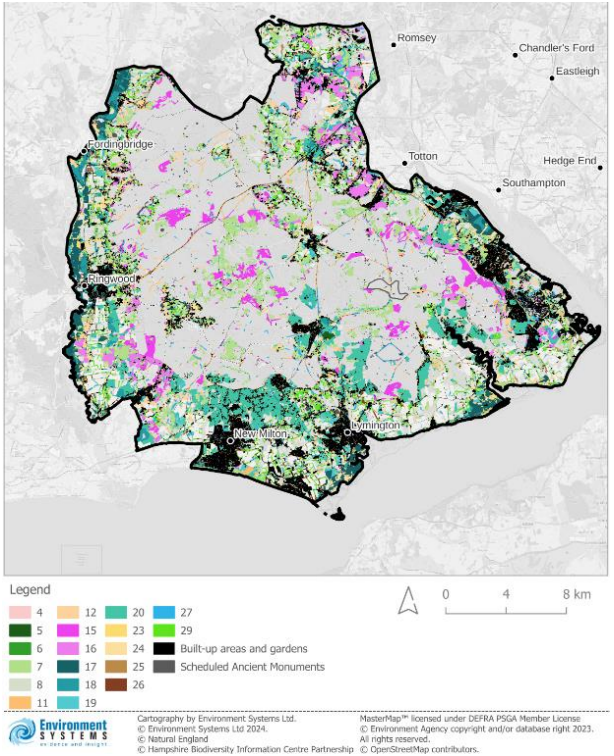
	Prime Areas (ha)	Other Areas (ha)
Grassland	399	966
Woodland	2,863	19
Heathland	983	1,307
Wetland	2,454	3,277
Farmland margins	257	685
Total	**6,955**	**6,253**
% of NCA	10%	9%

Numbers may not add due to rounding
Opportunities are illustrative of the type and scale of habitat creation that would be most beneficial to promoting nature recovery. Opportunities will be further refined through the work of the forth coming Local Nature Recovery Strategy.

Opportunities to enhance biodiversity have been considered based on ecological suitability and categorised as follows. Prime Target Areas (mainly woodland and wetland) covering 7,000 ha (or 10% of the NCA) are defined as:

- Opportunities to increase ecological connectivity and resilience ***and*** within a designated (priority) zone
- Opportunities to improve habitat within a designated (priority) zone, or
- Other opportunities to increase ecological connectivity and resilience but outside a designated area.

Other opportunities (6,300 ha or 9% of the NCA) are areas suitable for habitat improvement but not forming part of the ecological network nor inside a designated (priority) zone. Connecting forest to the coast



Link to map
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Priority opportunities, benefits and funding in New Forest

The scale of potential opportunities and funding at NCA level are shown here. The following slide lists more specific opportunities and where these may be implemented.

Actions	Natural capital benefits that can be achieved	Measuring and valuing those benefits	Funding potential
Soil monitoring & planning Regen-agriculture, SFI soil options	**Soil carbon sequestration:** Increase SoM% for all soils to maximum levels	• **Public:** up to 90,000 tCO_2e sequestered/year or up to £24 million per year (2024 values) • **Private:** Likely increase in productivity and improved resilience to drought	• **ELM**: SFI and CS options • **Carbon Markets**: Soil carbon market still emerging (indicative ~£4 million at current voluntary carbon prices)
Regen-agriculture Farm carbon audits and improvement planning	**GHG emissions reduction:** All farms improve emissions and shifts NCA average halfway towards best emissions per unit output	• **Public:** Up to 12,500 tCO_2e reduction per year, worth £1.7 – 3.4 million per year (2024 values) • **Private**: May reduce costs, other actions may add cost or reduce output but should be small (not quantified)	• **ELM:** SFI • **Supply chain assistance**: - (indicative carbon value ~£0.6 million/year at current voluntary carbon prices)
Nutrient planning, Regen-agriculture, SFI water quality options	**Water quality improvement:** Major reduction in nitrate leaching and improve all water bodies to good chemical status	• **Public:** Avoided nitrate removal costs £0.5 million/year (*Indicative - TBC with Water Co.s*) • **Private:** Wide variety of measures, precision fertiliser use will reduce costs	• **ELM**: SFI and CS options • **Water Co Funding**: ~£1 million? • **Self funding:** Savings in fertiliser cost
ELM CS options Woodland creation	**Biodiversity: Habitat creation and restoration** (see opportunity maps and habitat breakdown): • In priority area (7,000 ha, 10% of NCA) • Other areas (6,300 ha, 9% of NCA)	• **Public:** c33,000 tCO_2e sequestered/year, worth £4.5 – 9.0 million per year (2024 values); Improved SSSI condition and surface water condition; Enhanced ecological network for woodland, wetland and heath; Improved margins for wildlife on farmland • **Private:** May be some timber and wood fuel income from woodland creation	• **ELM:** CS options & landscape Recovery • **Woodland carbon credits**: ~£1.7 million /yr at current voluntary carbon prices • **Grant Funding**: Public, Private, NGO, philanthropic

Suggested priorities for improvement in New Forest map to the general priorities set for the NCA

General Priorities by the NCA & the National Park	Specific Opportunities	Where?
A. Restoring and enhancing the microbial health of all soils,	Monitor soils & create improvement plans	All Farmland
B. Reduce pollution entering rivers and chalk streams. Use nature based solutions to improve water quality.	Create nutrient plan	All Farmland
	Lower nitrate applications/ provide water quality features	In catchment sensitive zones
C. Protection of the internationally designated landscapes and coastlines, habitats and species;	Heathland creation (focus on priority sites)	In priority zones, but also other sites if suitable Importance of connecting the Forest to the coast and the Avon Valley through habitat restoration/connectivity
	Wetland creation (focus on priority sites)	
	Woodland creation (focus on priority sites)	
	New Hedgerow creation	Where the network is extended
D. Conserve and improve local distinctiveness in the traditional commoners' smallholdings, enclosed pastures, farmsteads, hamlets and settlements on the Forest fringe		Across all NCA
E. Promote the extent of open access, the high-quality semi-natural environment and the strong sense of human history as a special landscape for recreation and tourism		Across all NCA
F. Support and develop the 'catchment project' across the internationally recognised aquatic environments of the New Forest, Hampshire Avon and Blackwater drainage systems		Across all NCA
G: protect and continue to manage Site of Importance for Nature Conservation (SINCs)		In SINCs

Strategic Business Planning Framework for New Forest

Priority opportunities that are ecologically feasible, economically beneficial and has the potential to be funded:

- Biodiversity habitat creation and restoration (targeted at priority areas)
- Preserving habitat to support tourism, recreation and well-being
- Soil carbon sequestration
- GHG emission reduction
- Water quality improvement (mainly through nutrient reduction in Avon catchment)

1. **Drivers for Change**
- Climate change - worsening drought and water stress/pressures, wildfire risks.
- Population growth pressures on wildlife/habitat (especially visitors).

2. **Priorities for the NCA**
- Protect the internationally designated landscapes and coastlines, habitats and species
- Conserve and improve local distinctiveness in the traditional commoners' smallholdings, enclosed pastures, farmsteads, hamlets and settlements on the Forest fringe
- Promote the extent of open access, the high-quality semi-natural environment and the strong sense of human history as a special landscape for recreation and tourism
- Support and develop the 'catchment project' across the internationally recognised aquatic environments of the New Forest, Hampshire Avon and Blackwater drainage systems
- Protect Commons and Verderers rights
- Maintain access to the countryside for health and wellbeing

3. **Timescales**
- Nature sensitive farming uptake will be dependent upon availability of funding, knowledge and advice. Clear benefits case needs to be apparent. [Achievable at scale in medium term 10-20 years]
- Participation in water schemes depends upon attractiveness of incentives. Also groundwater hydrology means it may take decades for nitrate levels to fall after measures implemented.
- Habitat creation depends upon funding, advice & knowledge. Achievable in medium to long term (up to 50 years).

4. **Costs**
- Significant habitat creation (c 7,000 ha)
- Nutrient reduction measures across farmland in groundwater catchments (most of the NCA)

5. **Stakeholders**
- Convincing farmers/landowners/commoners is key to driving nature sensitive farming.
- Clear guidance should be provided on ecological priorities (what to create and where) in the NCA. See biodiversity opportunity map

6. **Risks**
- Soil sequestration is difficult to predict, and gains may be reversed. Understanding the saturation point of soils is key – greater soil monitoring and research is essential.
- Extent to which voluntary carbon markets may expand is uncertain. Soil carbon has significant potential but has challenges.
- Water quality funding to meet public water supply requirements may not be sufficient to improve the general water environment

7. **Key enablers**
- Advice & know how and to whom - Clear and agreed local priorities are communicated effectively
- Access to finance - Aggregator vehicles to reduce transaction costs and make projects more fundable

8. **Monitoring**
- Area of SSSI improving to favourable
- Uptake of nature sensitive farming methods (% of land managed in this way)
- Water quality measures (nitrate leaching balance to zero, improvement in WFD chemical status)
- Area of new habitat created /restored by type (woodland, wetland, heath, grassland etc).

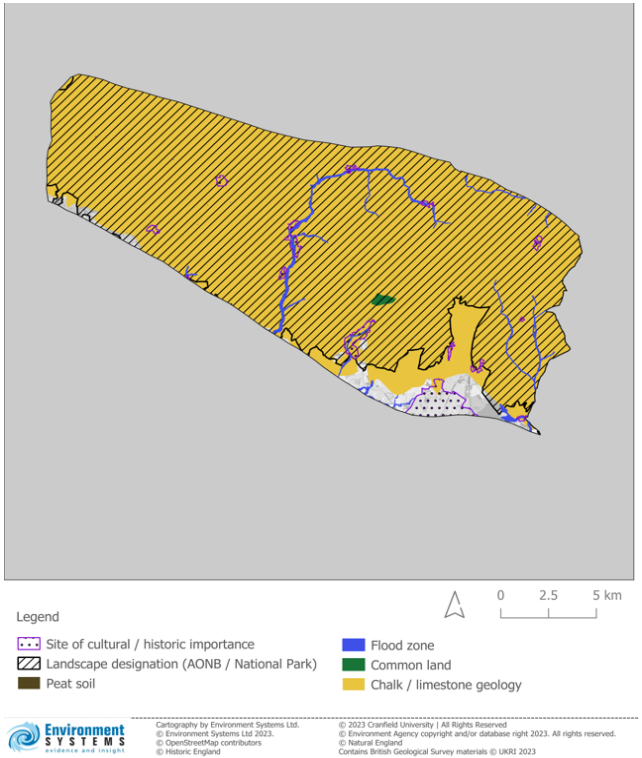
South Downs NCA

Table of Contents for South Downs NCA Assessment

Key natural assets in South Downs

Land Cover	Area (ha)	%
Arable	18,705	64%
Improved grassland	2,313	8%
Semi-natural grassland	952	3%
Rough pasture	20	<1%
Woodland & hedgerows	4,623	16%
Wetlands	9	<1%
Water bodies	52	<1%
Coastal margins	0	-
Urban/sub-urban	2,642	<1%
Other - sea	0	-
Total	**29,317**	**100%**

Numbers may not add due to rounding



Link to large scale map

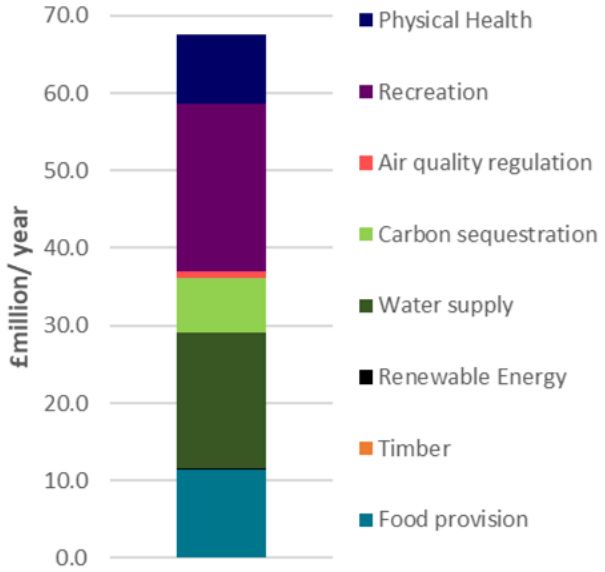
- Agriculture is the main land use (over 70% of NCA area and majority is arable).
- Water abstraction from Itchen chalk aquifer (12% in this NCA) provides a large % of public water supply.
- Key natural features include chalk soils, species rich grassland - impacted by diffuse water pollution.
- Woodland area at 16% is a valuable natural asset for wildlife and carbon sequestration.
- Majority of land is designated in South Downs NP (see map) and the local landscape contributes to the character of the Western portion of the NP.
- Given extent of agriculture, natural farmland features (hedgerows and margins) are important for wildlife.

Nature's benefits in South Downs

These are only a sub-set of benefits that have been possible to quantify and express in monetary terms. Significant benefits not evaluated in monetary terms: water quality regulation, flood risk mitigation, and diversity of nature

Benefit type	£m /year	%
Arable	**9.4**	14%
Livestock	**1.9**	3%
Timber	**0.1**	<1%
Renewable energy	**0.0**	<1%
Water supply	**17.7**	26%
Carbon sequestration	**7.0**	10%
Air quality regulation	**0.8**	1%
Recreation	**21.6**	32%
Physical Health	**8.9**	13%
Gross Benefits	**67.5**	100%

Numbers may not add due to rounding.



- Recreation (£22 million) & Physical health (£9 million) are the largest benefits in the NCA, reflecting the importance of the landscape to local residents and visitors to the National Park (spend within the National Park is substantial but not included below).
- Food production is the next largest benefit (£11 million/year) in line with the proportion of land used for farming. Crucially dependent on maintaining and enhancing soil condition as a mitigation against climate change and sustaining food production (also opportunity for further carbon sequestration).
- Public water supply depends on abstraction from the Itchen chalk groundwater aquifer. Under pressure from diffuse nitrate pollution and climate change.
- Woodland generates substantial benefits of carbon sequestration (£7m) and air pollution removal (£1m) benefits.
- The GHG footprint of farming is a substantial dis-benefit. Subject to high degree of variability (depending upon farming practice), but in the same order of magnitude as the gross margin of food production. Consequently, a priority area to monitor and reduce.

Disbenefits from agriculture in South Downs

(£m/year)	Low	Med	High
GHG emissions from arable land	(5.0)	(7.5)	(16.2)
GHG emissions from livestock	(2.9)	(5.7)	(11.0)
Diffuse water pollution from agriculture	(1.0)	(1.5)	(1.9)
Total costs	**(8.9)**	**(14.7)**	**(29.1)**

Numbers may not add due to rounding

The main environmental costs that we have quantified are:

- **GHG emissions from agriculture – evaluated separately for arable and livestock production**. The low and high estimates are based on national minimum and maximum footprints per unit of output, reflecting the very wide range in impacts. The medium is based on the mean estimates. These emissions are valued at the UK government central non-traded carbon value (2024).
- **Diffuse water pollution from agriculture**. Nitrate pollution a very significant cost in the South Downs. The estimate here is based on the expected costs of water treatment to remove nitrate. However, the cost to the the wider natural environment can be far higher.

Costs that we have not been able to quantify include:

- **Soil erosion and loss of soil organic carbon**. Some studies have estimated losses at over £1,000 million for England and Wales. It is not possible to apportion that cost to Hampshire Downs, but losses are likely to be significant, especially for intensive arable farming practices.
- **Loss of habitat and biodiversity**. Hampshire Downs has witnessed a significant decline in biodiversity since the 1950s, arising from human activity across the board from agriculture to residential and commercial development, in particular the loss of species rich grassland and wetland.

Risks to water and soils in South Downs

Waterbody Status

Groundwater condition	Area (ha)	% of NCA
Poor	27,721	96%
Good	1,268	4%
Surface water WFD Status	**Km**	**%**
High	-	-
Good	-	-
Moderate	28	100%
Poor	-	-
Bad	-	-
Total	**28**	**100%**

Numbers may not add due to rounding

Other elements at risk:

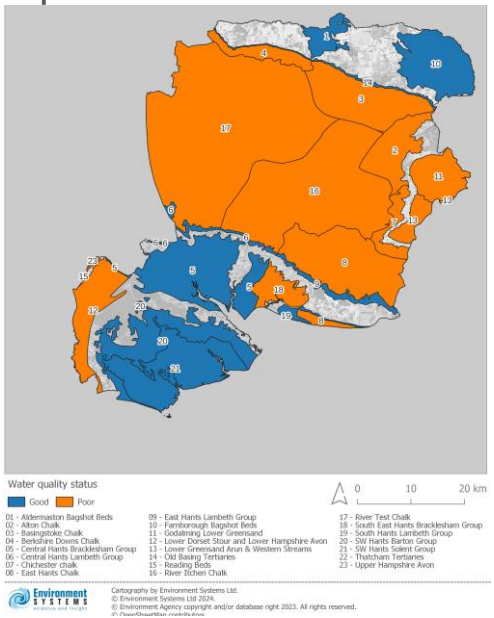
Wetlands & water bodies: Surface water bodies are in moderate condition, but the East Hants chalk and River Itchen chalk aquifers are in poor chemical condition due to nitrate pollution.

- 96% of groundwater is poor for chemical status. Diffuse nitrate pollution is a major problem for drinking water quality and work with farmers to reduce leaching is ongoing

Soil: Most land is ALC 3, and moderate soil carbon stock. Most of arable soil is at high risk of erosion.

- Almost all of the NCA is already drought limited and abstraction will become a more acute problem with climate change.

Hampshire Groundwater Chemical Status



Link to large scale map

Soil and drought risk maps:

Soil erosion risk map: Link to large scale map
Soil carbon stock map: Link to large scale map
Drought risk map: Link to large scale map

Risks to biodiversity in South Downs

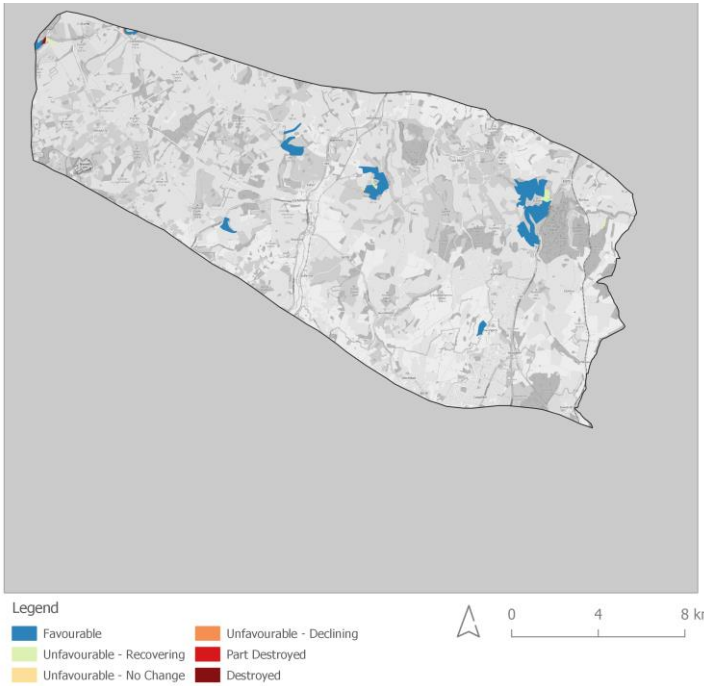
Designated and Priority Land/Habitats

Types overlap so are not additive.

Land	Area (ha)	% of NCA
Priority habitat	3,638	12.4%
Designated sites (SSSI)	425	1.5%
SSSI Status	**Area (ha)**	**% of SSSI**
Favourable	399	94%
Unfavourable Recovering	23	5%
Unfavourable No Change	1	<1%
Unfavourable Declining	0	-
Other	2	<1%
Total	**425**	**100%**

Numbers may not add due to rounding

- **NC Quality - Main Issues**: SSSI area is small (1.5%) but is largely favourable (94%).
- As farmland represents the major area of land use, losses of key features such as field margins, hedgerows and riparian woodland can have an adverse impact on biodiversity in the NCA.



SSSI Condition: Link to large scale map

Opportunities for improvement to soil and water in South Downs

All of the actions mentioned in the introduction can be undertaken in South Downs, and they have the potential to, jointly or individually, deliver many benefits and outcomes.

Given the current prevailing land use, and ecologically feasible opportunities in the NCA, the following maps assess the opportunities for the Board to consider:

- Soil carbon sequestration opportunities **map link**
- Soil erosion risk reduction opportunities **map link**
- Surface water quality improvement: **map link**
- Groundwater quality improvement: **map link**

Zoom into the links to see specific locations within South Downs and the scale of opportunity.

Opportunities for habitat creation in South Downs

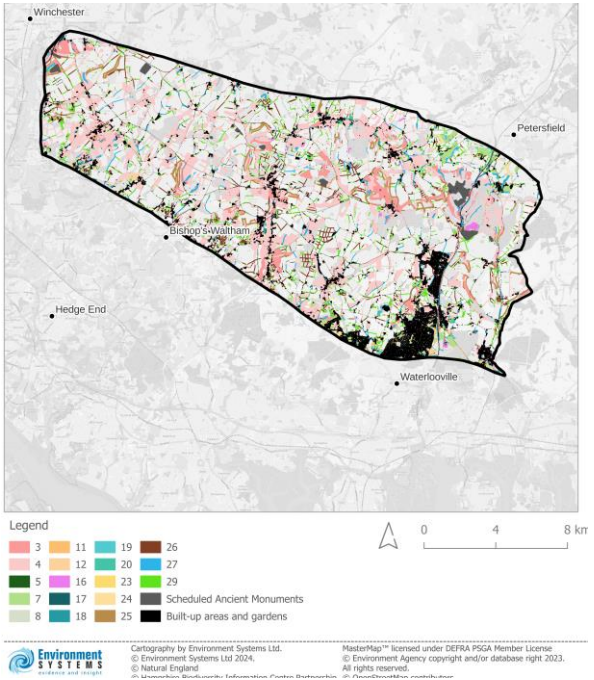
	Prime Areas (ha)	Other Areas (ha)
Grassland	690	3,004
Woodland	248	8
Heathland	-	41
Wetland	38	33
Farmland margins	167	641
Total	**1,143**	**3,727**
% of NCA	4%	13%

Numbers may not add due to rounding
Opportunities are illustrative of the type and scale of habitat creation that would be most beneficial to promoting nature recovery. Opportunities will be further refined through the work of the forth coming Local Nature Recovery Strategy.

Opportunities to enhance biodiversity have been considered based on ecological suitability and categorised as follows. **Prime Target Areas** covering 1,100 ha (4% of the NCA) are defined as:

- Opportunities to increase ecological connectivity and resilience ***and*** within a designated (priority) zone
- Opportunities to improve habitat within a designated (priority) zone, or
- Other opportunities to increase ecological connectivity and resilience but outside a designated area.

Other opportunities (3,700 ha or 13% of the NCA) are areas suitable for habitat improvement but not forming part of the ecological network nor inside a designated (priority) zone.



Link to map
For detail of legend see link here: legend

Priority opportunities, benefits and funding in South Downs

The scale of potential opportunities and funding at NCA level are shown here. The following slide lists more specific opportunities and where these may be implemented.

Actions	Natural capital benefits that can be achieved	Measuring and valuing those benefits	Funding potential
Soil monitoring & planning Regen-agriculture, SFI soil options	**Soil carbon sequestration:** Increase SOC% on average by up to 2%.	• **Public:** up to 90,000 tCO_2e sequestered/year or up to £24 million per year (2024 values) • **Private:** Likely increase in productivity and improved resilience to drought	• **ELM**: SFI and CS options • **Carbon Markets**: Soil carbon market still emerging (indicative ~£4 million at current voluntary carbon prices)
Regen-agriculture Farm carbon audits and improvement planning	**GHG emissions reduction:** All farms improve emissions and shifts NCA average halfway towards best emissions per unit output	• **Public:** Up to 20,000 tCO_2e reduction per year, worth £1-5 million per year (2024 values) • **Private**: May reduce costs, other actions may add cost or reduce output but should be small (not quantified)	• **ELM:** SFI • **Supply chain assistance**: - (indicative carbon value ~£0.5 million/year at current voluntary carbon prices)
Nutrient planning, Regen-agriculture, SFI water quality options	**Water quality improvement:** Major reduction in nitrate leaching and improve all water bodies to good chemical status	• **Public:** Avoided nitrate removal costs £1-2 million /year (*Indicative - TBC with Water Co*.s) • **Private:** Wide variety of measures, precision fertiliser use will reduce costs	• **ELM**: SFI and CS options • **Water Co Funding**: ~£1 million? • **Self funding:** Savings in fertiliser cost
ELM CS options Habitat creation/restoration Woodland creation	**Biodiversity: Habitat creation and restoration** (see opportunity maps and habitat breakdown): In priority area (7,000 ha, 10% of NCA) Other areas (6,300 ha, 9% of NCA)	• **Public:** 2,500 tCO_2e sequestered/year, worth £0.3-0.7 million per year (2024 values); Improved SSSI condition and surface water condition; Enhanced ecological network for woodland, wetland and heath; Improved margins for wildlife on farmland • **Private:** May be some timber and wood fuel income from woodland creation	• **ELM:** CS options & landscape Recovery • **Woodland carbon credits**: ~£0.1 million /yr at current voluntary carbon prices • **Grant Funding**: Public, Private, NGO, philanthropic

Suggested priority opportunities for improvement in South Downs map to the general priorities set for the NCA

General Priorities	Specific Opportunities	Where
A. Restoring and enhancing the microbial health of all soils, and protect the fragile chalk soils from further erosion	Monitor soils & create improvement plans	All Farmland
B. Reduce pollution entering rivers and chalk streams. Use nature based solutions to improve water quality.	Create nutrient plan	All Farmland
	Lower nitrate applications/ provide water quality features	In catchment sensitive zones
C. Protect, connect, enhance and expand key sites for nature	Create nutrient plan	All Farmland
	Grassland creation (focus on priority sites)	In priority zones, but also other sites if suitable.
	Improve/restore water bodies (esp Chalk streams)	
	Woodland creation (focus on priority sites)	
	Wetland creation (focus on priority sites)	
	Nature sensitive farming features (margins etc)	All Farmland
D. Increase woodland cover and permanent grassland for multiple benefits	As above for woodland and grassland	In priority zones, but also other sites if suitable.
E. Enhance access to the countryside for health and wellbeing	Create, maintain and improve public access	Improve network in scarce locations
F. Reduce nitrate levels through environmentally sensitive farming operations	Lower nitrate applications/ provide natural water quality features	In catchment sensitive zones
G: Restoration and management, including grazing, of species-rich, seminatural chalk grassland to achieve favourable condition;		In priority zones,
H. Extend semi natural species rich chalk grassland to achieve LNRS target		In priority zones,
I. Protect and continue to manage Sites of Importance for Nature Conservation (SINCs)		In SINCs

Strategic Business Planning Framework for South Downs

Priority opportunities that are ecologically feasible, economically beneficial and has the potential to be funded:

- Soil carbon sequestration
- GHG emission reduction
- Water quality improvement (mainly through nutrient reduction)
- Biodiversity habitat creation and restoration (targeted at priority areas)

1. **Drivers for Change**
   - Climate change - worsening drought and water stress/pressures, wildfire risks.
   - Ongoing nitrate pollution to water environment not sustainable
   - Development pressures on wildlife/habitat and water quality (especially nitrates).
   - Population growth - provision of space for recreation and well-being – moderate to low

2. **Priorities for the NCA**
   - Restore and enhance soils
   - Protect, connect, enhance and expand key sites for nature
   - Increase woodland cover and permanent grassland for multiple benefits
   - Enhance access to the countryside for health and wellbeing
   - Reduce nitrate levels through environmentally sensitive farming operations for nature
   - Maintain access to the countryside for health and wellbeing

3. **Timescales**
   - Nature sensitive farming uptake will be dependent upon availability of funding, knowledge and advice. Clear benefits case needs to be apparent. [Achievable at scale in medium term 10-20 years]
   - Participation in water schemes depends upon attractiveness of incentives. Also groundwater hydrology means is make take decades for nitrate levels to fall after measures implemented.
   - Habitat creation depends upon funding, advice & knowledge. Achievable in medium to long term (up to 50 years).

4. **Costs**:
   - Significant investment in nature sensitive farming techniques on around 18,000 ha of farmland (c 100 holdings)
   - Nutrient reduction measures across farmland in groundwater catchments (most of the NCA)
   - 1,100 ha of priority habitat creation (mainly chalk grassland and woodland)

5. **Stakeholders**
   - Convincing farmers/landowners (around 100 holdings) is key to driving nature sensitive farming.
   - Farm clusters vital for coordinated water quality improvement. These can also help as aggregators for private finance schemes.
   - Clear guidance should be provided on ecological priorities (what to create and where) in the NCA. See biodiversity opportunity map.

6. **Risks**
   - Soil sequestration is difficult to predict, and gains may be reversed. Understanding the saturation point of soils is key – greater soil monitoring and research is essential.
   - Extent to which voluntary carbon markets may expand is uncertain. Soil carbon has significant potential but has challenges.
   - Water quality funding to meet public water supply requirements may not be sufficient to improve the general water environment

7. **Key enablers**
   - Advice & know how and to whom
   - Access to finance - Aggregator vehicles to reduce transaction costs and make projects more fundable.
   - Clear and agreed local priorities are communicated effectively

8. **Monitoring**
   - Uptake of nature sensitive farming methods (% of land managed in this way)
   - Water quality measures (nitrate leaching balance to zero, improvement in WFD chemical status)
   - Area of new habitat created /restored by type (woodland, wetland, heath, grassland etc).

South Hampshire Lowlands NCA

eftec economics for the environment

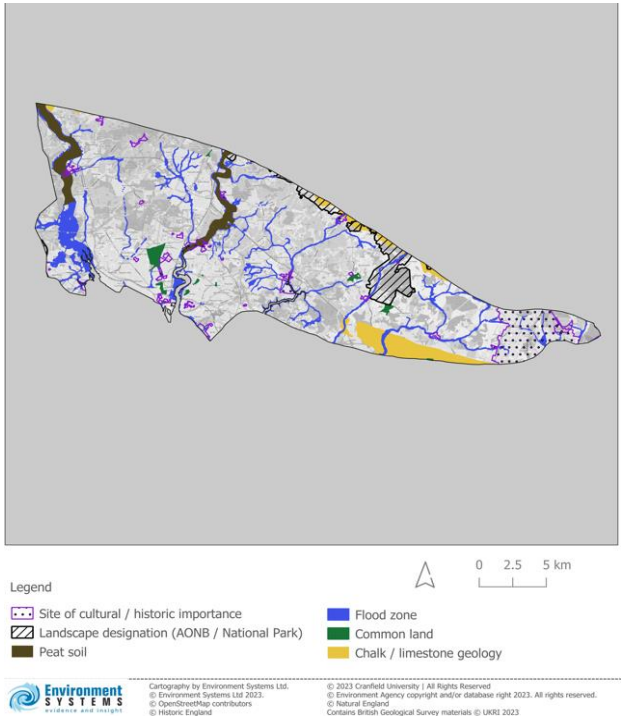
Environment SYSTEMS evidence and insight

Table of Contents for South Hampshire Lowlands NCA Assessment

Key natural assets in South Hampshire Lowlands

Land Cover	Area (ha)	%
Arable	9,939	26%
Improved grassland	5,602	15%
Semi-natural grassland	1,544	4%
Rough pasture	158	<1%
Woodland & hedgerows	7,682	20%
Wetlands	309	1%
Water bodies	405	1%
Coastal margins	57	<1%
Urban/sub-urban	12,882	33%
Other - sea	11	<1%
Total	**38,590**	**100%**

Numbers may not add due to rounding



Link to large scale map

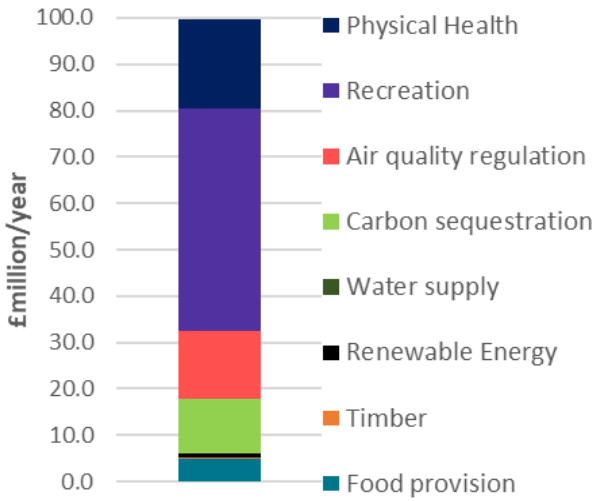
- Agricultural land use is over 40% of NCA area, but around third is urban/sub-urban, as the NCA includes Southampton and several other major settlements.. Other key assets and uses:
- Woodland area at 20% is a valuable natural asset for wildlife and carbon sequestration. Almost half is designated ancient woodland
- Public rights of way and greenspace are important recreational assets for the relatively high urban population.
- Given extent of agriculture, natural farmland features (hedgerows and margins) are important for wildlife.

Nature's benefits in South Hampshire Lowlands

These are only a sub-set of benefits that have been possible to quantify and express in monetary terms. Significant benefits not evaluated in monetary terms: water quality regulation, flood risk mitigation, and diversity of nature

Benefit type	£m /year	%
Arable	2.7	3%
Livestock	2.4	2%
Timber	0.3	<1%
Renewable energy	0.8	1%
Water supply	0.0	-
Carbon sequestration	11.9	12%
Air quality regulation	14.6	15%
Recreation	48.0	48%
Physical Health	19.1	19%
Gross Benefits	**99.7**	**100%**

Numbers may not add due to rounding.



- Recreation (£48 million) & Physical health (£19 million) are the largest benefits in the NCA, reflecting the proximity and importance of the landscape to local urban population.
- Woodland generates substantial benefits of carbon sequestration (£12m) and air pollution removal (£15m) benefits, the latter being particularly high due to the proximity of woodland to urban source of air pollution.
- Food production is a relatively small benefit (£5 million/year) in line with the proportion of land used for farming.

Disbenefits from agriculture in South Hampshire Lowlands

(£m/year)	Low	Mid	High
GHG emissions from arable land	(1.4)	(2.2)	(5.3)
GHG emissions from livestock	(3.6)	(7.2)	(14.2)
Diffuse water pollution from agriculture		-	
Total costs	**(5.0)**	**(9.4)**	**(19.5)**

Numbers may not add due to rounding

The main environmental costs that we have quantified are:

- **GHG emissions from agriculture – evaluated separately for arable and livestock production**. The low and high estimates are based on national minimum and maximum footprints per unit of output, reflecting the very wide range in impacts. The medium is based on the mean estimates. These emissions are valued at the UK government central non-traded carbon value (2024).
- **Diffuse water pollution from agriculture**. Nitrate pollution is an issue in the South Hampshire Lowlands, but there was insufficient information to estimate costs to PWS. However, the cost to the the wider natural environment can be far higher.

Costs that we have not been able to quantify include:

- **Soil erosion and loss of soil organic carbon**. Some studies have estimated losses at over £1,000 million for England and Wales. It is not possible to apportion that cost to Hampshire Downs, but losses are likely to be significant, especially for intensive arable farming practices.
- **Loss of habitat and biodiversity**. Hampshire Downs has witnessed a significant decline in biodiversity since the 1950s, arising from human activity across the board from agriculture to residential and commercial development, in particular the loss of species rich grassland and wetland.

Risks to water and soils in South Hampshire Lowlands

Waterbody Status

Groundwater condition	Area (ha)	% of NCA
Poor	6,739	26%
Good	18,715	74%

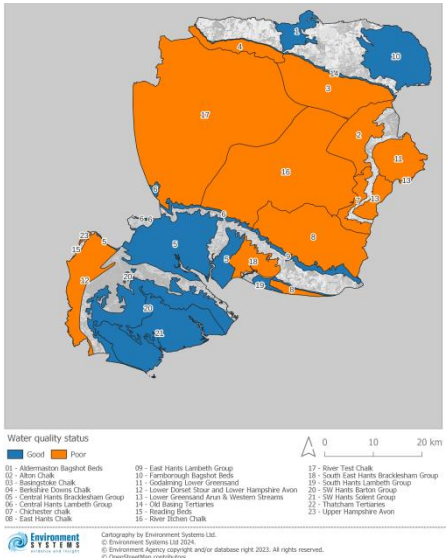
Surface water WFD Status	Km	%
High		
Good	64	35%
Moderate	112	61%
Poor	2	1%
Bad	4	2%
Total	**183**	**100%**

Numbers may not add due to rounding

Other elements at risk –

- **Wetlands & water bodies**: 35% of surface water bodies are in good condition and 61% in moderate condition, however 3% is in bad or poor condition. 26% of aquifers are in poor chemical condition.
- **Soil**: Most land is either ALC 3 or 4, but with some pockets of high value ALC 1 and 2. Moderate soil carbon stock. Most of arable soil is at high risk of erosion.
- Some of the NCA is already drought limited and abstraction will become a more acute problem with climate change.

Hampshire Groundwater Chemical Status



Link to large scale map

Soil and drought risk maps:

Soil erosion risk map: Link to large scale map
Soil carbon stock map: Link to large scale map
Drought risk map: Link to large scale map

Risks to biodiversity in South Hampshire Lowlands

Designated and Priority Land/Habitats
Types overlap so are not additive.

Land	Area (ha)	% of NCA
Priority habitat	6,766	17.5%
Designated sites (SSSI)	1,152	3.0%
SSSI Status	**Area (ha)**	**% of SSSI**
Favourable	239	21%
Unfavourable Recovering	725	63%
Unfavourable No Change	149	13%
Unfavourable Declining	34	3%
Other	4	<1%
Total	**1,152**	**100%**

Numbers may not add due to rounding

- **NC Quality** - Main Issues: SSSI area is small (3%) but only 21% is favourable.
- As farmland represents the major area of land use, losses of key features such as field margins, hedgerows and riparian woodland can have an adverse impact on biodiversity in the NCA.

SSSI Condition: [Link to large scale map]

Opportunities for improvement to soil and water in South Hampshire Lowlands

All of the actions mentioned in the introduction can be undertaken in South Hampshire Lowlands, and they have the potential to, jointly or individually, deliver many benefits and outcomes.

Given the current prevailing land use, and ecologically feasible opportunities in the NCA, the following maps assess the opportunities for the Board to consider:

- Soil carbon sequestration opportunities map link
- Soil erosion risk reduction opportunities map link
- Surface water quality improvement: map link
- Groundwater quality improvement: map link

Zoom into the links to see specific locations within South Hampshire Lowlands and the scale of opportunity.

Opportunities for habitat creation in South Hampshire Lowlands

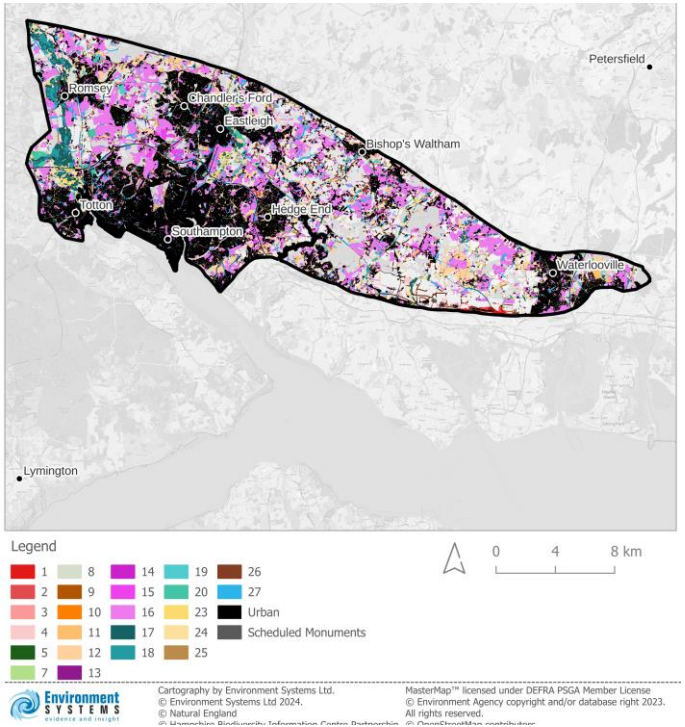
	Prime Areas (ha)	Other Areas (ha)
Grassland	377	1,555
Woodland	6	1
Heathland	109	4,966
Wetland	1,133	245
Farmland margins	-	879
Total	**1,625**	**7,645**
% of NCA	4%	20%

Numbers may not add due to rounding
Opportunities are illustrative of the type and scale of habitat creation that would be most beneficial to promoting nature recovery. Opportunities will be further refined through the work of the forth coming Local Nature Recovery Strategy.

Opportunities to enhance biodiversity have been considered based on ecological suitability and categorised as follows. **Prime Target Areas** covering 1,600 ha (4% of the NCA) are defined as:

- Opportunities to increase ecological connectivity and resilience ***and*** within a designated (priority) zone
- Opportunities to improve habitat within a designated (priority) zone, or
- Other opportunities to increase ecological connectivity and resilience but outside a designated area.

Other opportunities (7,600 ha or 20% of the NCA) are areas suitable for habitat improvement but not forming part of the ecological network nor inside a designated (priority) zone.



Link to map
For detail of legend see link here: legend

Priority opportunities, benefits and funding in South Hampshire Lowlands

The scale of potential opportunities and funding at NCA level are shown here. The following slide lists more specific opportunities and where these may be implemented.

Actions	Natural capital benefits that can be achieved	Measuring and valuing those benefits	Funding potential
Soil monitoring & planning Regen-agriculture, SFI soil options	**Soil carbon sequestration:** Increase SOC% on average by up to 2%.	• **Public:** up to 70,000 tCO_2e sequestered/year or £20 million per year (2024 values) • **Private:** Likely increase in productivity and improved resilience to drought	• **ELM**: SFI and CS options • **Carbon Markets**: Soil carbon market still emerging (indicative ~£3 million at current voluntary carbon prices)
Regen-agriculture Farm carbon audits and improvement planning	**GHG emissions reduction:** All farms improve emissions and shifts NCA average halfway towards best emissions per unit output	• **Public:** Up to 18,000 tCO_2e reduction per year, worth £1.2-5.0 million per year (2024 values) • **Private**: May reduce costs, other actions may add cost or reduce output but should be small (not quantified)	• **ELM:** SFI • **Supply chain assistance**: - (indicative carbon value ~£0.5 million/year at current voluntary carbon prices)
Nutrient planning, Regen-agriculture, SFI water quality options	**Water quality improvement:** Major reduction in nitrate leaching and improve all water bodies to good chemical status	• **Public:** Avoided nitrate removal costs assumed small (*Indicative - TBC with Water Co*.s) • **Private:** Wide variety of measures, precision fertiliser use will reduce costs	• **ELM**: SFI and CS options • **Water Co Funding**: ~ small as other NCAs are priority? • **Self funding:** Savings in fertiliser cost
ELM CS options Habitat creation/restoration Woodland creation	**Biodiversity: Habitat creation and restoration** (see opportunity maps and habitat breakdown): In priority area (7,000 ha, 10% of NCA) Other areas (6,300 ha, 9% of NCA)	• **Public:** 3,400 tCO_2e sequestered/year, worth £0.5 – 0.9 million per year (2024 values); Improved SSSI condition and surface water condition; Enhanced ecological network for woodland, wetland and heath; Improved margins for wildlife on farmland • **Private:** May be some timber and wood fuel income from woodland creation	• **ELM:** CS options & landscape Recovery • **Woodland carbon credits**: ~0.2 million /yr at current voluntary carbon prices • **Grant Funding**: Public, Private, NGO, philanthropic

Suggested priority opportunities for improvement in South Hampshire Lowlands map to the general priorities set for the NCA

General Priorities	Specific Opportunities	Where
A. Restoring and enhancing the microbial health of all soils;	Monitor soils & create improvement plans	All Farmland
B. Reduce nitrate levels through environmentally sensitive farming operations	Create nutrient plan	All Farmland
	Lower nitrate applications/ provide natural water quality features	All Farmland
C. Reduce pollution entering Southampton Water, the Test and Itchen rivers	Lower nitrate applications/ provide natural water quality features	In catchment sensitive zones
D. Protect Southampton Water's internationally recognised habitats supporting breeding and overwintering waterfowl and waders and mudflats and salt marshes	Lower nitrate applications/ provide natural water quality features	In catchment sensitive zones
E. Protect, connect, enhance and expand key sites for nature	Grassland creation (focus on priority sites)	In priority zones, but also other sites if suitable.
	Improve/restore water bodies (esp Chalk streams)	
	Heathland creation (focus on priority sites)	
	Wetland creation (focus on priority sites)	
	New Hedgerow creation	Where connecting to network
F. Increasing opportunities for access to the countryside for health and Wellbeing	Create, maintain and improve public access	Improve network in scarce locations
G. Restoration and management, including grazing, of species-rich, seminatural chalk grassland to achieve favourable condition		In priority zones
H. Extend semi natural species rich chalk grassland (to achieve LNRS target);		In priority zones
I. Protect and continue to manage Sites of Importance for Nature Conservation (SINCs)		In SINCs

Strategic Business Planning Framework for South Hampshire Lowlands

Priority opportunities that are ecologically feasible, economically beneficial and has the potential to be funded:

- Soil carbon sequestration
- GHG emission reduction
- Biodiversity habitat creation and restoration (targeted at priority areas)
- Provision of public rights of way to improve recreational access and well-being

1. **Drivers for Change**
- Climate change - worsening drought and water stress/pressures, wildfire risks.
- Development pressures on wildlife/habitat and water quality (especially nitrates).
- Population growth - provision of space for recreation and well-being – moderate to low

2. **Priorities for the NCA**
- Restore and enhance soils
- Reduce nitrate levels through environmentally sensitive farming operations
- Reduce pollution entering Southampton Water, the Test and Itchen rivers
- Protect Southampton Water's internationally recognised habitats supporting breeding and overwintering waterfowl and waders and mudflats and salt marshes
- Protect, connect, enhance and expand key sites for nature
- Enhance access to the countryside for health and wellbeing

3. **Timescales**
- Nature sensitive farming uptake will be dependent upon availability of funding, knowledge and advice. Clear benefits case needs to be apparent. [Achievable at scale in medium term 10-20 years]
- Participation in water schemes depends upon attractiveness of incentives. Also groundwater hydrology means is make take decades for nitrate levels to fall after measures implemented.
- Habitat creation depends upon funding, advice & knowledge. Achievable in medium to long term (up to 50 years).

4. **Costs**
- Significant investment in nature sensitive farming techniques on around 12,000 ha of farmland (c 200 holdings)
- Nutrient reduction measures across farmland in groundwater catchments (most of the NCA)
- 1,600 ha of priority habitat creation (mainly wetland)

5. **Stakeholders**
- Convincing farmers/landowners (around 200 holdings) is key to driving nature sensitive farming.
- Farm clusters vital for coordinated water quality improvement. These can also help as aggregators for private finance schemes.
- Clear guidance should be provided on ecological priorities (what to create and where) in the NCA. See biodiversity opportunity map.

6. **Risks**
- Soil sequestration is difficult to predict, and gains may be reversed. Understanding the saturation point of soils is key – greater soil monitoring and research is essential.
- Extent to which voluntary carbon markets may expand is uncertain. Soil carbon has significant potential but has challenges.
- Water quality funding to meet public water supply requirements may not be sufficient to improve the general water environment

7. **Key enablers**
- Advice & know how and to whom
- Access to finance - Aggregator vehicles to reduce transaction costs and make projects more fundable.
- Clear and agreed local priorities are communicated effectively

8. **Monitoring**
- Uptake of nature sensitive farming methods (% of land managed in this way)
- Water quality measures (nitrate leaching balance to zero, improvement in WFD chemical status)
- Area of new habitat created /restored by type (woodland, wetland, heath, grassland etc).

Thames Basin Heaths NCA

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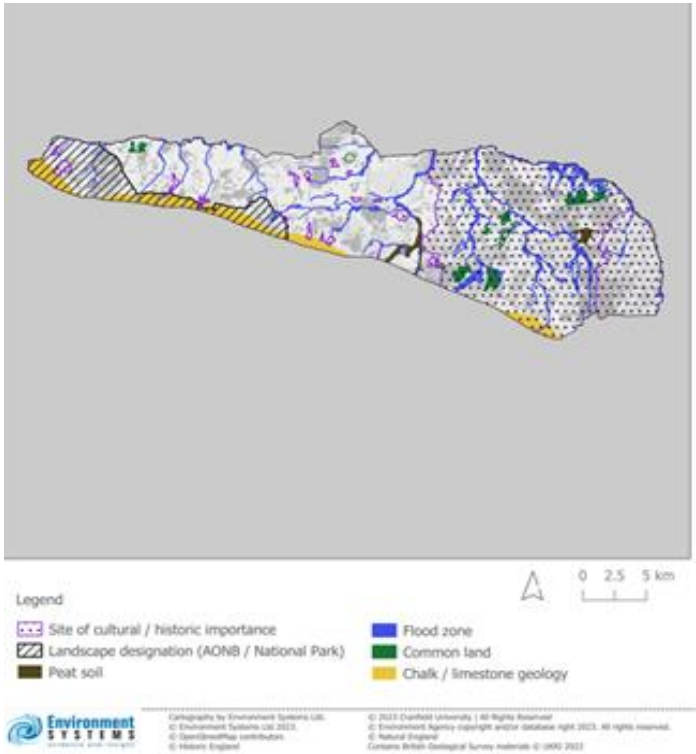
Table of Contents for Thames Basin Heaths NCA Assessment

Key natural assets in Thames Basin Heaths

Land Cover	Area (ha)	%
Arable	15,641	37%
Improved grassland	4,379	10%
Semi-natural grassland	979	2%
Rough pasture	779	2%
Woodland & hedgerows	10,871	26%
Wetlands	283	1%
Water bodies	518	1%
Coastal margins	2	<1%
Urban/sub-urban	8,395	20%
Other - sea	0	-
Total	**41,846**	**100%**

Numbers may not add due to rounding

- Agriculture is the main land use (around 50% of NCA area and majority is grazing).
- Woodland area at 26% is particularly high, due to acid sandy soils not suitable for agriculture, and a valuable natural asset for wildlife and carbon sequestration. Significant pine plantations.
- A small proportion of land is designated in South Downs NP (see map).
- High proportion of urban/sub-urban land reflects the large urban areas of Farnborough, Aldershot, Fleet etc.
- Given extent of agriculture, natural farmland features (hedgerows and margins) are important for wildlife.



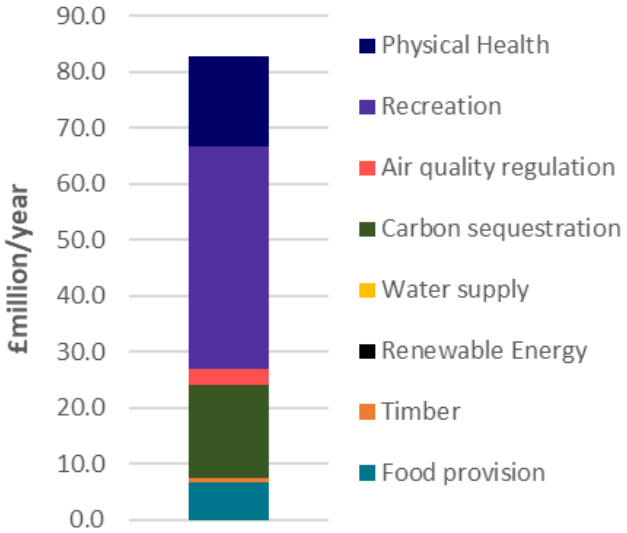
Link to large scale map

Nature's benefits in Thames Basin Heaths

These are only a sub-set of benefits that have been possible to quantify and express in monetary terms. Significant benefits not evaluated in monetary terms: water quality regulation, flood risk mitigation, and diversity of nature

Benefit type	£m /year	%
Arable food production	**4.9**	6%
Livestock food production	**1.9**	2%
Timber production	**0.7**	1%
Renewable energy (solar)	**0.1**	<1%
Water supply	**0.0**	-
Carbon sequestration	**16.5**	20%
Air quality regulation	**2.8**	3%
Recreation	**40.0**	48%
Physical Health	**16.1**	19%
Gross Benefits	**82.9**	100%

Numbers may not add due to rounding.



- Recreation (£40 million) & Physical health (£16 million) are the largest benefits in the NCA, reflecting the proximity and importance of the landscape to local urban population (Aldershot, Farnborough, Fleet etc).
- Woodland generates substantial benefits of carbon sequestration (£16m) and air pollution removal (£3m) benefits.
- Food production is a relatively small benefit (£7 million/year) in line with the proportion of land used for farming.

Disbenefits from agriculture in Thames Basin Heaths

(£m/year)	Low	Mid	High
GHG emissions from arable land	(2.4)	(4.0)	(8.7)
GHG emissions from livestock	(2.8)	(5.5)	(10.7)
Diffuse water pollution from agriculture		-	
Total costs	**(5.2)**	**(9.5)**	**(19.4)**

Numbers may not add due to rounding

The main environmental costs that we have quantified are:

- **GHG emissions from agriculture – evaluated separately for arable and livestock production**. The low and high estimates are based on national minimum and maximum footprints per unit of output, reflecting the very wide range in impacts. The medium is based on the mean estimates. These emissions are valued at the UK government central non-traded carbon value (2024).
- **Diffuse water pollution from agriculture**. Nitrate pollution is an issue in the Thames Basin Heaths, but there was insufficient information to estimate costs to PWS. However, the cost to the the wider natural environment can be far higher..

Costs that we have not been able to quantify include:

- **Soil erosion and loss of soil organic carbon**. Some studies have estimated losses at over £1,000 million for England and Wales. It is not possible to apportion that cost to Hampshire Downs, but losses are likely to be significant, especially for intensive arable farming practices.
- **Loss of habitat and biodiversity**. Hampshire Downs has witnessed a significant decline in biodiversity since the 1950s, arising from human activity across the board from agriculture to residential and commercial development, in particular the loss of species rich grassland and wetland.

Risks to water and soils in Thames Basin Heaths

Waterbody Status

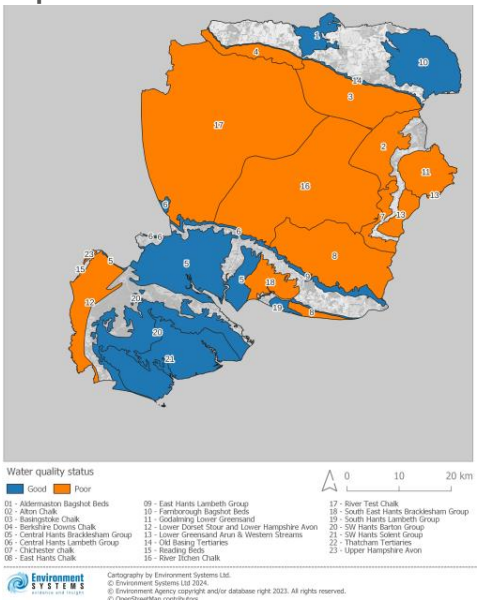
Groundwater condition	Area (ha)	% of NCA
Poor	2,318	11%
Good	18,037	89%

Surface water WFD Status	Km	%
High		
Good		
Moderate	126	62%
Poor	67	33%
Bad	9	4%
Total	**202**	**100%**

Numbers may not add due to rounding

- Wetlands & water bodies: 62% of surface water bodies are in moderate condition and 38% are in bad or poor condition. 11% of aquifers are in poor chemical condition.
- Soil: Most land is either ALC 3 or 4, with a large proportion of land not used for agriculture (urban or woodland). Moderate soil carbon stock.
- Much of the NCA is already drought limited and abstraction will become a more acute problem with climate change.

Hampshire Groundwater Chemical Status



Link to large scale map

Soil and drought risk maps:

Soil erosion risk map: Link to large scale map
Soil carbon stock map: Link to large scale map
Drought risk map: Link to large scale map

Risks to biodiversity in Thames Basin Heaths

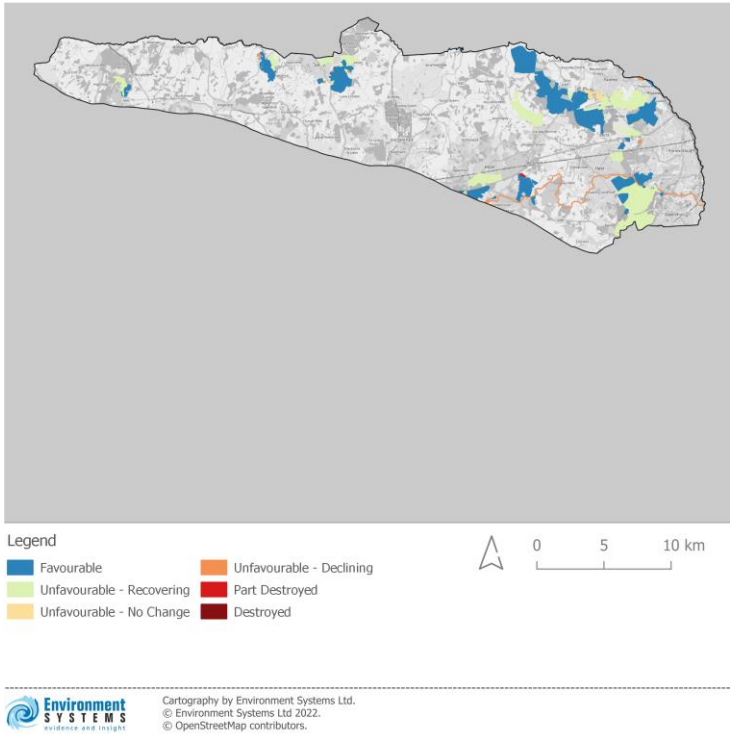
Designated and Priority Land/Habitats

Types overlap so are not additive.

Land	Area (ha)	% of NCA
Priority habitat	8,602	20.6%
Designated sites (SSSI)	3,713	8.9%
SSSI Status	**Area (ha)**	**% of SSSI**
Favourable	2,104	57%
Unfavourable Recovering	1,511	41%
Unfavourable No Change	41	1%
Unfavourable Declining	50	1%
Other	6	<1%
Total	**3,712**	**100%**

Numbers may not add due to rounding

- NC Quality - Main Issues: SSSI area is small (9%) but the majority (57%) is in favourable condition.
- As farmland represents 40% of land use, losses of key features such as field margins, hedgerows and riparian woodland can have an adverse impact on biodiversity in the NCA.



SSSI Condition: Link to large scale map

Opportunities for improvement to soil and water in Thames Basin Heaths

All of the actions mentioned in the introduction can be undertaken in Thames Basin Heaths, and they have the potential to, jointly or individually, deliver many benefits and outcomes.

Given the current prevailing land use, and ecologically feasible opportunities in the NCA, the following maps assess the opportunities for the Board to consider:

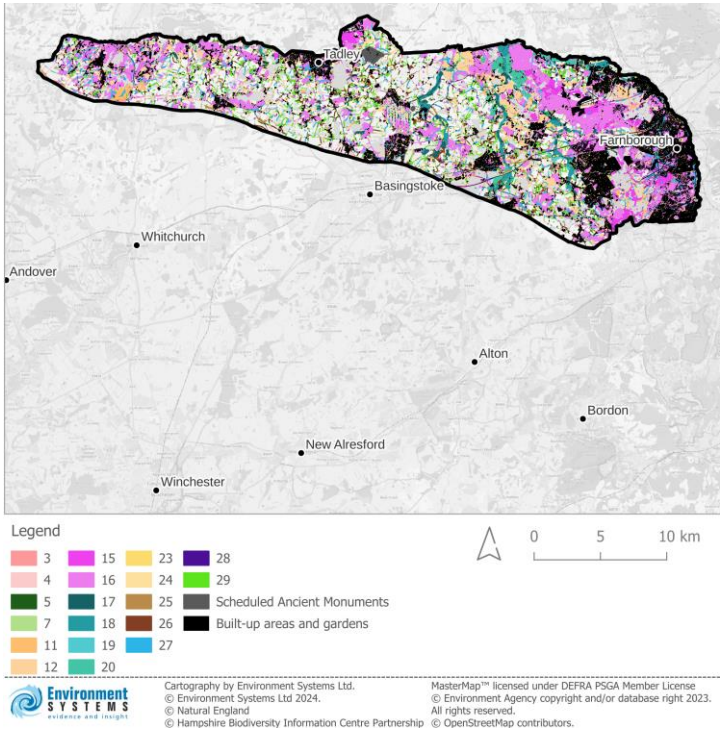
- Soil carbon sequestration opportunities map link
- Soil erosion risk reduction opportunities map link
- Surface water quality improvement: map link
- Groundwater quality improvement: map link

Zoom into the links to see specific locations within Thames Basin Heaths and the scale of opportunity.

Opportunities for habitat creation in Thames Basin Heaths

	Prime Areas (ha)	Other Areas (ha)
Grassland	323	1,709
Woodland	10	-
Heathland	579	4,952
Wetland	1,064	455
Farmland margins	217	920
Total	**2,193**	**8,036**
% of NCA	5%	19%

Numbers may not add due to rounding
Opportunities are illustrative of the type and scale of habitat creation that would be most beneficial to promoting nature recovery. Opportunities will be further refined through the work of the forth coming Local Nature Recovery Strategy.



Opportunities to enhance biodiversity have been considered based on ecological suitability and categorised as follows. **Prime Target Areas** covering 2,200 ha (5% of the NCA) are defined as:

- Opportunities to increase ecological connectivity and resilience ***and*** within a designated (priority) zone
- Opportunities to improve habitat within a designated (priority) zone, or
- Other opportunities to increase ecological connectivity and resilience but outside a designated area.

Other opportunities (8,000 ha or 19% of the NCA) are areas suitable for habitat improvement but not forming part of the ecological network nor inside a designated (priority) zone.

Link to map
For detail of legend see link here: legend

Priority opportunities, benefits and funding in Thames Basin Heaths

The scale of potential opportunities and funding at NCA level are shown here. The following slide lists more specific opportunities and where these may be implemented.

Actions	Natural capital benefits that can be achieved	Measuring and valuing those benefits	Funding potential
Soil monitoring & planning Regen-agriculture, SFI soil options	**Soil carbon sequestration:** Increase SOC% on average by up to 2%.	• **Public:** up to 90,000 tCO_2e sequestered/year orup to £24 million per year (2024 values) • **Private:** Likely increase in productivity and improved resilience to drought	• **ELM**: SFI and CS options • **Carbon Markets**: Soil carbon market still emerging (indicative ~£4 million at current voluntary carbon prices)
Regen-agriculture Farm carbon audits and improvement planning	**GHG emissions reduction:** All farms improve emissions and shifts NCA average halfway towards best emissions per unit output	• **Public:** Up to 8,000-16,000 tCO_2e reduction per year, worth £1.1-4.2 million per year (2024 values) • **Private**: May reduce costs, other actions may add cost or reduce output but should be small (not quantified)	• **ELM:** SFI • **Supply chain assistance**: - (indicative carbon value ~£0.4 million/year at current voluntary carbon prices)
Nutrient planning, Regen-agriculture, SFI water quality options	**Water quality improvement:** Major reduction in nitrate leaching and improve all water bodies to good chemical status	• **Public:** Avoided nitrate removal costs assumed small (*Indicative - TBC with Water Co*.s) • **Private:** Wide variety of measures, precision fertiliser use will reduce costs	• **ELM**: SFI and CS options • **Water Co Funding**: small as other NCAs are priority?? • **Self funding:** Savings in fertiliser cost
ELM CS options Habitat creation/restoration Woodland creation	**Biodiversity: Habitat creation and restoration** (see opportunity maps and habitat breakdown): In priority area (7,000 ha, 10% of NCA) Other areas (6,300 ha, 9% of NCA)	• **Public:** 4,400 tCO_2e sequestered/year, worth £0.6 1.2 million per year (2024 values); Improved SSSI condition and surface water condition; Enhanced ecological network for woodland, wetland and heath; Improved margins for wildlife on farmland • **Private:** May be some timber and wood fuel income from woodland creation	• **ELM:** CS options & landscape Recovery • **Woodland carbon credits**: ~£0.2 million /yr at current voluntary carbon prices • **Grant Funding**: Public, Private, NGO, philanthropic

Suggested priority opportunities for improvement in Thames Basin Heaths map to the general priorities set for the NCA

General Priorities	Specific Opportunities	Where
A. Restoring and enhancing the microbial health of all soils	Monitor soils & create improvement plans	All Farmland
B. Protecting, connecting, enhancing and expanding key sites for nature, with the focus on priority sites; with the focus on Internationally important heathlands	Create nutrient plan	All Farmland
	Species rich Grassland creation (focus on priority sites)	In priority zones, but also other sites if suitable.
	Improve/restore water bodies (esp Chalk streams)	
	Heathland creation (focus on priority sites)	
	Wetland creation (focus on priority sites)	
	Woodland creation (focus on priority sites)	
	New Hedgerow creation	
	Nature sensitive farming	All Farmland
C. Reduce pollution entering rivers and use nature based solutions to improve water quality	Lower nitrate applications/ provide natural water quality features	In catchment sensitive zones
D. Maintain access to the countryside for health and wellbeing	Create, maintain and improve public access	Improve network in scarce locations
E. Reduce nitrate levels through environmentally sensitive farming operations	Lower nitrate applications/ provide natural water quality features	In catchment sensitive zones
F. Protecting, enhancing, and expanding Lowland Dry Acid grassland;		In priority zones
G. Protect and continue to manage Sites of Importance for Nature Conservation (SINCs)		In SINCs

Strategic Business Planning Framework for Thames Basin Heaths

Priority opportunities that are ecologically feasible, economically beneficial and has the potential to be funded:

- Soil carbon sequestration
- GHG emission reduction
- Water quality improvement (mainly through nutrient reduction)
- Biodiversity habitat creation and restoration (targeted at priority areas)

1. **Drivers for Change**
- Climate change - worsening drought and water stress/pressures, wildfire risks.
- Ongoing nitrate pollution to water environment not sustainable
- Development pressures on wildlife/habitat and water quality (especially nitrates).
- Population growth - provision of space for recreation and well-being – moderate to low

2. **Priorities for the NCA**
- Restore and enhance soils
- Protect, connect, enhance and expand key sites for nature
- Reduce pollution entering rivers, water meadows, and the flood plains
- Maintain access to the countryside for health and wellbeing
- Reduce nitrate levels through environmentally sensitive farming operations

3. **Timescales**
- Nature sensitive farming uptake will be dependent upon availability of funding, knowledge and advice. Clear benefits case needs to be apparent. [Achievable at scale in medium term 10-20 years]
- Participation in water schemes depends upon attractiveness of incentives. Also groundwater hydrology means is make take decades for nitrate levels to fall after measures implemented.
- Habitat creation depends upon funding, advice & knowledge. Achievable in medium to long term (up to 50 years).

4. **Costs**
- Significant investment in nature sensitive farming techniques on around 15,000 ha of farmland (c 200 holdings)
- Nutrient reduction measures across farmland in groundwater catchments (most of the NCA)
- 2,000 ha of priority habitat creation (mainly wetland and heath to support Thames Basin Heath SPA)

5. **Stakeholders**
- Convincing farmers/landowners (around 200 holdings) is key to driving nature sensitive farming.
- Farm clusters vital for coordinated water quality improvement. These can also help as aggregators for private finance schemes.
- Clear guidance should be provided on ecological priorities (what to create and where) in the NCA. See biodiversity opportunity map.

6. **Risks**
- Soil sequestration is difficult to predict, and gains may be reversed. Understanding the saturation point of soils is key – greater soil monitoring and research is essential.
- Extent to which voluntary carbon markets may expand is uncertain. Soil carbon has significant potential but has challenges.
- Recreational pressure may have adverse impacts on the Thames Basin Heath SPA.

7. **Key enablers**
- Advice & know how and to whom
- Access to finance - Aggregator vehicles to reduce transaction costs and make projects more fundable.
- Clear and agreed local priorities are communicated effectively

8. **Monitoring**
- Uptake of nature sensitive farming methods (% of land managed in this way)
- Water quality measures (nitrate leaching balance to zero, improvement in WFD chemical status)
- Area of new habitat created /restored by type (woodland, wetland, heath, grassland etc).

Wealden Greensand NCA

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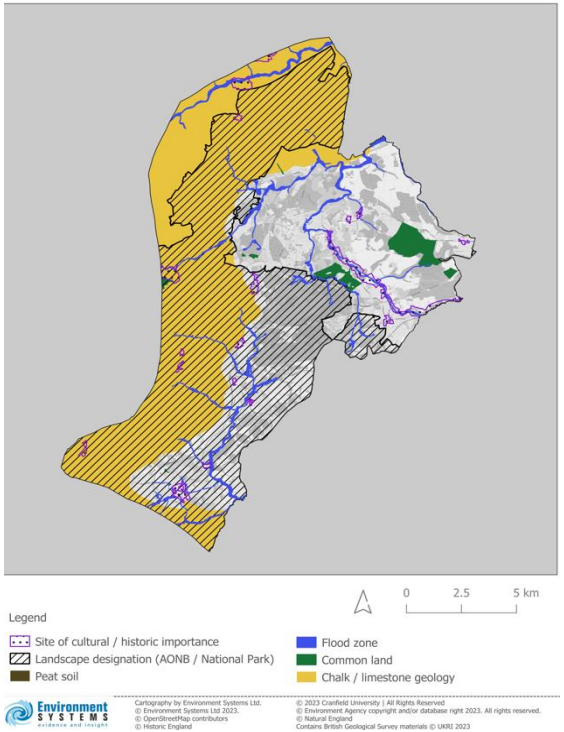
Table of Contents for Wealden Greensand NCA Assessment

Key natural assets in Wealden Greensand

Land Cover	Area (ha)	%
Arable	7,954	38%
Improved grassland	2,260	11%
Semi-natural grassland	398	2%
Rough pasture	877	4%
Woodland & hedgerows	5,688	27%
Wetlands	69	<1%
Water bodies	195	1%
Coastal margins	0	-
Urban/sub-urban	3,259	16%
Other - sea	0	-
Total	**20,700**	**100%**

Numbers may not add due to rounding



Link to large scale map

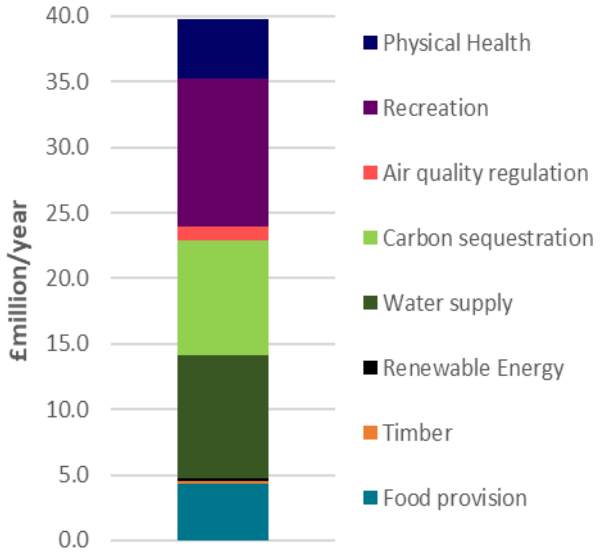
- Agriculture is the main land use (over 50% of NCA area)
- Key natural features include chalk soils, species rich grassland - impacted by diffuse water pollution.
- Woodland area at 27% is very high and a valuable natural asset for wildlife and carbon sequestration.
- Majority of land is designated in South Downs NP (see map) and the local landscape contributes to the character of the Western portion of the national park.
- Given extent of agriculture, natural farmland features (hedgerows and margins) are important for wildlife.

Nature's benefits in Wealden Greensand

These are only a sub-set of benefits that have been possible to quantify and express in monetary terms. Significant benefits not evaluated in monetary terms: water quality regulation, flood risk mitigation, and diversity of nature

Benefit type	£m /year	%
Arable food production	**3.1**	8%
Livestock food production	**1.2**	3%
Timber production	**0.3**	1%
Renewable energy (solar)	**0.2**	<1%
Water supply	**9.4**	24%
Carbon sequestration	**8.8**	22%
Air quality regulation	**1.1**	3%
Recreation	**11.3**	28%
Physical Health	**4.5**	11%
Gross Benefits	**30.4**	100%

Numbers may not add due to rounding.



- Recreation (£11 million) & Physical health (£4 million) are the largest benefits in the NCA - support the visits to the National Park.
- Woodland generates substantial benefits of carbon sequestration (£9m) and air pollution removal (£1m) benefits.
- Food production is a relatively small benefit (£4 million/year) but some of the NCA is high value orchard.
- Water supply is significant (£9 million/year)

Disbenefits from agriculture in Wealden Greensand

(£m/year)	Low	Mid	High
GHG emissions from arable land	(1.4)	(2.5)	(5.4)
GHG emissions from livestock	(1.8)	(3.6)	(7.0)
Diffuse water pollution from agriculture		-	
Total costs	**(3.3)**	**(6.1)**	**(12.3)**

Numbers may not add due to rounding

The main environmental costs that we have quantified are:

- **GHG emissions from agriculture – evaluated separately for arable and livestock production**. The low and high estimates are based on national minimum and maximum footprints per unit of output, reflecting the very wide range in impacts. The medium is based on the mean estimates. These emissions are valued at the UK government central non-traded carbon value (2024).
- **Diffuse water pollution from agriculture**. Nitrate pollution is an issue in the Wealden Greensand, but there was insufficient information to estimate costs to PWS. However, the cost to the the wider natural environment can be far higher.

Costs that we have not been able to quantify include:

- **Soil erosion and loss of soil organic carbon**. Some studies have estimated losses at over £1,000 million for England and Wales. It is not possible to apportion that cost to Hampshire Downs, but losses are likely to be significant, especially for intensive arable farming practices.
- **Loss of habitat and biodiversity**. Hampshire Downs has witnessed a significant decline in biodiversity since the 1950s, arising from human activity across the board from agriculture to residential and commercial development, in particular the loss of species rich grassland and wetland.

Risks to water and soils in Wealden Greensand

Waterbody Status

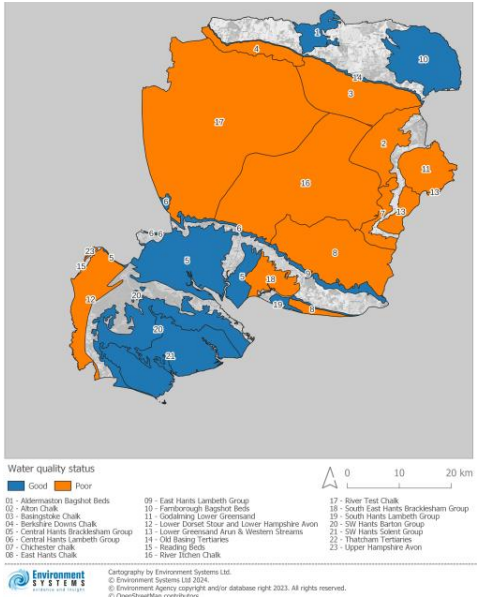
Groundwater condition	Area (ha)	% of NCA
Poor	15,888	100%
Good	-	-

Surface water WFD Status	Km	%
High	-	-
Good	6	9%
Moderate	45	65%
Poor	18	26%
Bad	-	-
Total	**69**	**100%**

Numbers may not add due to rounding

- Wetlands & water bodies: 65% of surface water bodies are in moderate condition and 26% are in poor condition. 100% of aquifers are in poor chemical condition.
- Soil: Most land is either ALC 3 or 4, with pockets of higher grade 2 land. Moderate soil carbon stock.
- Much of the NCA is already drought limited and abstraction will become a more acute problem with climate change.

Hampshire Groundwater Chemical Status



Link to large scale map

Soil and drought risk maps:

Soil erosion risk map: Link to large scale map
Soil carbon stock map: Link to large scale map
Drought risk map: Link to large scale map

Risks to biodiversity in Wealden Greensand

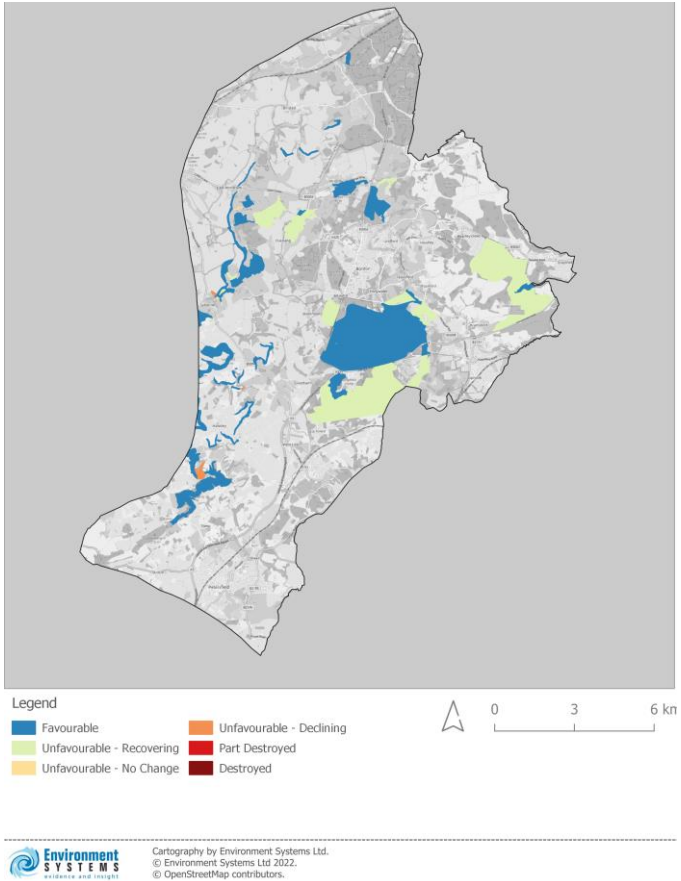
Designated and Priority Land/Habitats

Types overlap so are not additive.

Land	Area (ha)	% of NCA
Priority habitat	4,409	21.3%
Designated sites (SSSI)	2,298	11.1%
SSSI Status	**Area (ha)**	**% of SSSI**
Favourable	1,253	55%
Unfavourable Recovering	1,031	45%
Unfavourable No Change	2	<1%
Unfavourable Declining	13	1%
Other	-	-
Total	**2,298**	**100%**

Numbers may not add due to rounding

- NC Quality - Main Issues: SSSI area is significant (11%) and the majority (55%) is in favourable condition.
- As farmland represents the major area of land use, losses of key features such as field margins, hedgerows and riparian woodland can have an adverse impact on biodiversity in the NCA.



SSSI Condition: Link to large scale map

Opportunities for improvement to soil and water in Wealden Greensand

All of the actions mentioned in the introduction can be undertaken in Wealden Greensand , and they have the potential to, jointly or individually, deliver many benefits and outcomes.

Given the current prevailing land use, and ecologically feasible opportunities in the NCA, the following maps assess the opportunities for the Board to consider:

- Soil carbon sequestration opportunities map link
- Soil erosion risk reduction opportunities map link
- Surface water quality improvement: map link
- Groundwater quality improvement: map link

Zoom into the links to see specific locations within Wealden Greensand and the scale of opportunity.

Opportunities for habitat creation in Wealden Greensand

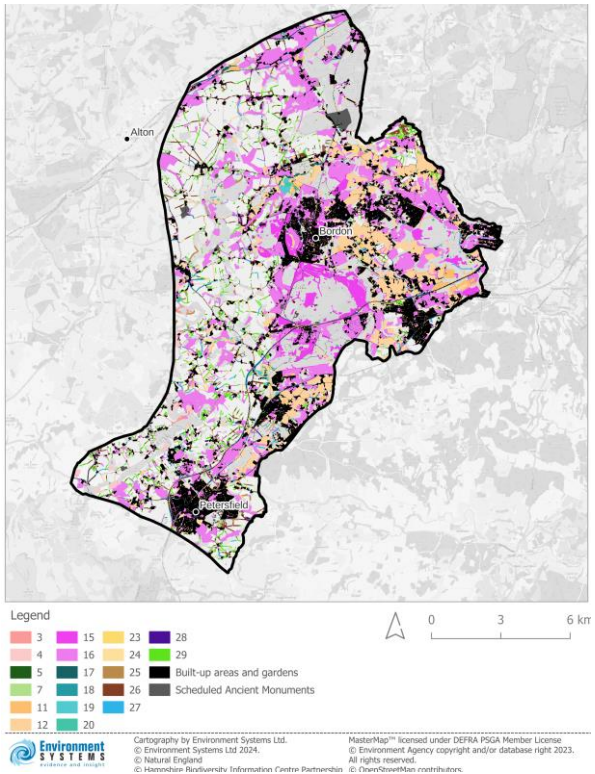
	Prime Areas (ha)	Other Areas (ha)
Grassland	125	1,320
Woodland	4	-
Heathland	402	2,839
Wetland	76	19
Farmland margins	103	194
Total	**709**	**4,371**
% of NCA	3%	21%

Numbers may not add due to rounding
Opportunities are illustrative of the type and scale of habitat creation that would be most beneficial to promoting nature recovery. Opportunities will be further refined through the work of the forth coming Local Nature Recovery Strategy.

Opportunities to enhance biodiversity have been considered based on ecological suitability and categorised as follows. **Prime Target Areas** covering 700 ha (3% of the NCA) are defined as:

- Opportunities to increase ecological connectivity and resilience ***and*** within a designated (priority) zone
- Opportunities to improve habitat within a designated (priority) zone, or
- Other opportunities to increase ecological connectivity and resilience but outside a designated area.

Other opportunities (4,300 ha or 21% of the NCA) are areas suitable for habitat improvement but not forming part of the ecological network nor inside a designated (priority) zone.



Link to map
For detail of legend see link here: legend

Priority opportunities, benefits and funding in Wealden Greensand

The scale of potential opportunities and funding at NCA level are shown here. The following slide lists more specific opportunities and where these may be implemented.

Actions	Natural capital benefits that can be achieved	Measuring and valuing those benefits	Funding potential
Soil monitoring & planning Regen-agriculture, SFI soil options	**Soil carbon sequestration:** Increase SOC% on average by up to 2%.	• **Public:** up to 45,000 tCO_2e sequestered/year or £12 million per year (2024 values) • **Private:** Likely increase in productivity and improved resilience to drought	• **ELM**: SFI and CS options • **Carbon Markets**: Soil carbon market still emerging (indicative ~£2 million at current voluntary carbon prices)
Regen-agriculture Farm carbon audits and improvement planning	**GHG emissions reduction:** All farms improve emissions and shifts NCA average halfway towards best emissions per unit output	• **Public:** Up to 10,000 tCO_2e reduction per year, worth £0.7-2.8 million per year (2024 values) • **Private**: May reduce costs, other actions may add cost or reduce output but should be small (not quantified)	• **ELM:** SFI • **Supply chain assistance**: - (indicative carbon value ~£0.3 million/year at current voluntary carbon prices)
Nutrient planning, Regen-agriculture, SFI water quality options	**Water quality improvement:** Major reduction in nitrate leaching and improve all water bodies to good chemical status	• **Public:** Avoided nitrate removal costs £0.5 million/year (*Indicative - TBC with Water Co*.s) • **Private:** Wide variety of measures, precision fertiliser use will reduce costs	• **ELM**: SFI and CS options • **Water Co Funding**: <£1million? • **Self funding:** Savings in fertiliser cost
ELM CS options Habitat creation/restoration Woodland creation	**Biodiversity: Habitat creation and restoration** (see opportunity maps and habitat breakdown): In priority area (7,000 ha, 10% of NCA) Other areas (6,300 ha, 9% of NCA)	• **Public:** up to 2,000 tCO_2e sequestered/year, worth £0.3-0.5 million per year (2024 values); Improved SSSI condition and surface water condition; Enhanced ecological network for woodland, wetland and heath; Improved margins for wildlife on farmland • **Private:** May be some timber and wood fuel income from woodland creation	• **ELM:** CS options & landscape Recovery • **Woodland carbon credits**: ~£0.1 million /yr at current voluntary carbon prices • **Grant Funding**: Public, Private, NGO, philanthropic

Suggested priority opportunities for improvement in Wealden Greensand map to the general priorities set for the NCA

General Priorities	Specific Opportunities	Where
A. Restore and enhance soils	Monitor soils & create improvement plans	All Farmland
B. Reduce nitrate levels through environmentally sensitive farming operations	Create nutrient plan	
	Lower nitrate applications/ provide natural water quality features	In catchment sensitive zones
C. Reduce pollution entering rivers and chalk streams. Use nature based solutions to improve water quality	Prevent soil erosion and use nature based solutions to improve water quality	In catchment sensitive zones
D. Protecting, connecting, enhancing and expanding key sites for nature, with the focus on priority sites;	Grassland creation (focus on priority sites)	In priority zones, but also other sites if suitable.
	Heathland creation (focus on priority sites)	
	Wetland creation (focus on priority sites)	
	Nature sensitive farming features (margins etc)	All Farmland
E. Protecting Commons and Verderers rights;	Protect Commons and Verderers rights	On common land
F. Maintain access to the countryside for health and wellbeing	Create, maintain and improve public access	Prioritise expansion to existing networks and area of high demand
G. Protecting, enhancing, and expanding Lowland Dry Acid grassland	Grassland creation (focus on priority sites)	In priority zones, but also other sites if suitable.
H. Protect and continue to manage Sites of Importance for Nature Conservation (SINCs)	As above in D	In SINCs

Strategic Business Planning Framework for Wealden Greensand

Priority opportunities that are ecologically feasible, economically beneficial and has the potential to be funded:

- Soil carbon sequestration
- GHG emission reduction
- Water quality improvement (mainly through nutrient reduction)
- Biodiversity habitat creation and restoration (targeted at priority areas)

1. **Drivers for Change**
- Climate change - worsening drought and water stress/pressures, wildfire risks.
- Ongoing nitrate pollution to water environment not sustainable
- Development pressures on wildlife/habitat and water quality (especially nitrates).
- Population growth - provision of space for recreation and well-being – moderate to low

2. **Priorities for the NCA**
- Restore and enhance soils
- Reduce nitrate levels through environmentally sensitive farming operations
- Protect, connect, enhance and expand key sites for nature
- Protect Commons and Verderers rights
- Maintain access to the countryside for health and wellbeing

3. **Timescales**
- Nature sensitive farming uptake will be dependent upon availability of funding, knowledge and advice. Clear benefits case needs to be apparent. [Achievable at scale in medium term 10-20 years]
- Participation in water schemes depends upon attractiveness of incentives. Also groundwater hydrology means is make take decades for nitrate levels to fall after measures implemented.
- Habitat creation depends upon funding, advice & knowledge. Achievable in medium to long term (up to 50 years).

4. **Costs**
- Significant investment in nature sensitive farming techniques on around 10,000 ha of farmland (c 100 holdings)
- Nutrient reduction measures across farmland in groundwater catchments (most of the NCA)
- 700 ha of priority habitat creation (mainly heathland, but also some hedgerow and grassland)

5. **Stakeholders**
- Convincing farmers/landowners (around 100 holdings) is key to driving nature sensitive farming.
- Farm clusters vital for coordinated water quality improvement. These can also help as aggregators for private finance schemes.
- Clear guidance should be provided on ecological priorities (what to create and where) in the NCA. See biodiversity opportunity map.

6. **Risks**
- Soil sequestration is difficult to predict, and gains may be reversed. Understanding the saturation point of soils is key – greater soil monitoring and research is essential.
- Extent to which voluntary carbon markets may expand is uncertain. Soil carbon has significant potential but has challenges.
- Water quality funding to meet public water supply requirements may not be sufficient to improve the general water environment

7. **Key enablers**
- Advice & know how and to whom
- Access to finance - Aggregator vehicles to reduce transaction costs and make projects more fundable.
- Clear and agreed local priorities are communicated effectively

8. **Monitoring**
- Uptake of nature sensitive farming methods (% of land managed in this way)
- Water quality measures (nitrate leaching balance to zero, improvement in WFD chemical status)
- Area of new habitat created /restored by type (woodland, wetland, heath, grassland etc).

Annex

What benefits are Evaluated?

Food Production

Produce food whilst sustainably using natural resources
***Valued by** gross margin of food produced*

Protect and Restore Biodiversity

Enhance protected areas, manage pressures on habitats and species, and reverse losses in biodiversity
***Not valued in monetary terms** – measured by area created or restored*

Water Supply & Quality

Maintain and enhance water resources & the quality of water in the environment
***Valued by** provision value of water supplied*

Timber Production

Produce timber and wood fuel whilst sustainably using natural resources
***Valued by** gross margin of timber & woodfuel produced*

Climate Mitigation through bio-carbon

Invest in land use to reduce emissions of greenhouse gases and increase carbon sequestration
***Valued by** non-traded value of carbon*

Air Quality

Improve air quality to support human health and well-being
***Valued by** avoided health costs of cleaner air*

Improve access and engagement with natural environment

Maintain and improve access to and the condition of green spaces for recreation and well-being
***Valued by** welfare value of recreation*

Physical health
***Valued by** avoided health impacts and associated costs due to active recreation according to government health guidance*

Disbenefits - method

The main environmental costs that we have quantified include:

- ***GHG emissions from agriculture***. There is a wide range in the GHG footprint of food production, (for example winter wheat can range[1] from 0.12 to 0.93 tCO_2e per tonne of crop produced, with a mean of 0.34 tCO_2e/t. Likewise, the footprint of milk [2] can vary from 0.8 $kgCO_2e$/litre to 2.1 $kgCO_2e$/litre, with a mean of 1.2.). The low and high estimates in the table are based on these extremes and the medium is based on the mean estimates. These emissions are valued at the UK government central non-traded carbon value (2024).

- ***Diffuse water pollution from agriculture***. Nutrients and pesticides are pollutants to the water environment, but nitrate pollution is the most significant cost in the Hampshire Downs. This can be measured in terms of the expected costs of water treatment to remove, nitrate (as in the table below). However, the cost to the the wider natural environment can be far higher.

Costs that we have not been able to quantify include:

- **Soil erosion and loss of soil organic carbon**. Some studies[3] have estimated losses at over £1,000 million for England and Wales. Specific losses for Hampshire require more data to provide an estimate for the soil profile of the specific NCAs in this project. Losses are likely to be significant, especially for intensive arable farming practices.

Note 1: CHAP & AHDB, (2022). Benchmarking emissions for UK agriculture and horticulture.
URL: https://chap-solutions.co.uk/projects/benchmarking-emissions-for-uk-agriculture-and-horticulture/
Note 2: Livestock production footprints are taken from AHDB at: https://ahdb.org.uk/knowledge-library/carbon-footprints-food-and-farming
Note 3: Graves et al (2015), The total costs of soil degradation in England and Wales, Ecological Economics 119 (2015) 399–413

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